

Disaster Debris Management Training Manual



California Emergency Management Agency
Technical Assistance Programs
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Debris Management Overview


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Introduction



It's Not Just Taking Out The Trash

- Debris removal costs average 40% of the total cost of a disaster
- Debris quantities in natural events are increasing
 - Natural disasters are happening more often
 - More developments in hazardous areas
 - Larger and more complex facilities
- Since 2003, debris removal costs for California are approximately \$228.6 million



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Disaster debris management costs average out to be 40% of the total cost of any given disaster. Since 2003, disaster debris costs in California have totaled approximately \$228.6 million.

To effectively prepare for and respond to debris-related issues, it is necessary to have an understanding of the types of debris that are generated in the various disasters.


This section provides:

- Examples of typical disasters types and resulting debris.
- Examples of typical debris situations that may be encountered in actual disasters.
- Discussions of general issues that should be considered in debris planning and issues that have arisen in recent disasters and what we've learned.


Disaster Type & Characteristics

**Storm, Flood, Tsunami & Dam Failure Characteristics**

- High velocity flows
- Several large waves
- Surges
- Inundation
- Landslides




St. Francis Dam - March 1928




Otsuchi, Japan - March 2011

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**Storm, Flood, Tsunami & Dam Failure Debris**

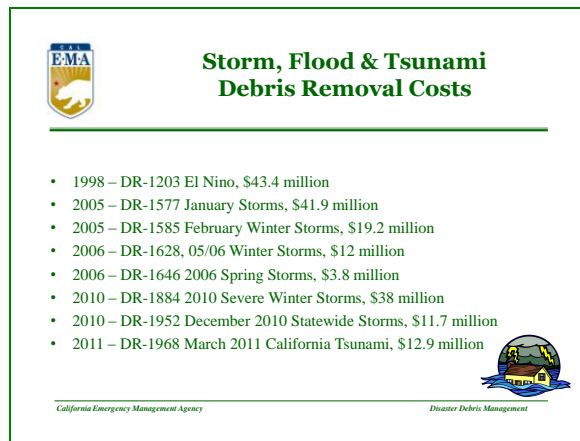
- Sediment
- Electronic debris
- Personal property
- Metals
- Vegetative debris
- Animal carcasses
- Sandbags
- White metals
- Construction & demolition material
- Human remains
- Hazardous household waste
- Vehicles & boats



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Storms/Floods

- Characteristics:
 - High velocity flows
 - Inundation
 - Landslides
- Most areas of the country have experienced natural disasters in flooding – from the slow-rising expansive type seen in the Midwest to the flash flooding in the western and eastern mountain areas
- Structural damage may occur from flood saturation and from high velocity flow and forces from sediment transport
- Floods are often the most difficult disaster events relative to debris:
 - Often, all possessions are destroyed
 - ◆ Clothes, furniture, personal affects
 - ◆ Carpet, sheetrock, wood
 - Debris is put out for collection in waves for long periods of time
 - ◆ As water levels recede
 - ◆ Emotionally difficult to part with items
 - ◆ Some (particularly the elderly) may need assistance in moving objects
 - ◆ Delays due to homeowners waiting for Hazard Mitigation Grant Program (HMGP) buyout offers
- Secondary Impacts: Landslides, erosion of homes, facilities, roads, trees, and falling boulders



Storm Events

1998 – DR-1203 El Nino - \$43.4 million
2005 – DR-1577 January Storms - \$41.9 million
 DR-1585 2005 February Winter Storms - \$19.2 million
2006 – DR-1628 2005/06 Winter Storms - \$12 million
 DR-1646 2006 Spring Storms - \$3.8 million
2010 – DR-1884 2010 Severe Winter Storms - \$38 million
 DR-1952 December 2010 Statewide Storms - \$11.7 million
2011 – Spring Storms - \$4.4 million

Tsunamis

Tsunamis are generated by earthquakes, volcanic eruptions and submarine landslides and usually in this order of frequency.

There are three destructive factors: inundation, wave impact on structures and erosion. Strong Tsunami induced currents lead to erosion of foundations and the collapse of bridges and seawalls. Flotation and drag forces move houses and overturn railroad cars. Considerable damage is caused from floating debris that becomes dangerous projectiles that crash into buildings; break power lines and starts fires. Fires from damaged ships in ports or from ruptured coastal oil storage tanks and refineries can cause damage greater than that inflicted directly by the tsunami. An increasing concern is the potential effect of tsunami draw down, when the receding waters uncover cooling water intakes of nuclear power plants.

- The 1964 Alaska Earthquake, magnitude 8.4, caused areas to be lifted as much as 50 feet in certain areas, while others greatly subsided. In addition, many local tsunamis generated within Prince William Sound created a Pacific-wide tsunami. This caused:
 - o Destruction occurred in southeastern Alaska, in Vancouver Island, Washington, California and Hawaii
 - o Killed 120 people
 - o \$106 million in damages
 - o In Crescent City, CA, the waves reached more than 21 feet, destroyed half the waterfront businesses and 11 people were killed

- o Santa Cruz Harbor waves reached 11 feet causing some damage
- o Extensive damage in San Francisco Bay, Marin County marinas and at Noyo Harbor (Fort Bragg), Los Angeles and Long Beach harbors
- o California's loses were estimated to be between \$1.5 and \$2.3 (1964 dollars) million, while Crescent City damage was estimated at over \$7.4 million


Other Notable Tsunami Events

- 1700 – Crescent City, Lagoon Creek Orick, Cascadia subduction zone EQ - paleotsunami deposits.
- 1868 – San Francisco, Santa Cruz, Sacramento, 7.0 EQ on Hayward fault – 19 foot surge on shore at Cliff House, wave observed in Sacramento River and water seen rushing up river in Santa Cruz.
- 1883 – Sausalito, Krakatau Volcano – air pressure wave recorded on marigram.
- 2004 – Several coastal areas affected, Sumatran EQ – waves over 1 foot recorded on marigram. \$4.4 billion in total damages
- 2011 – Japan Tsunami
 - o California - \$50.7 million in total damages, \$12.9 million of this for debris removal
 - o Hawaii – Estimated \$30 million in total damages
 - o Oregon – Estimated \$6.6 million in total damages

Dam Failure

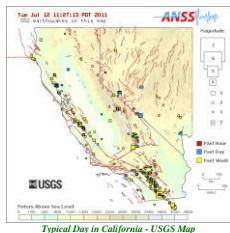
There have been a total of 45 recorded dam failures in California. Failures have occurred for a variety of reasons, the most common failure being overtopping. Other dams have failed due to specific shortcomings in the dam itself or an inadequate assessment of the surrounding geomorphologic characteristics. The first notable dam failure occurred in 1858 in Sierra County, while the most recent failure occurred in 1965. The greatest catastrophe relating to California dam failures was William Mulholland's infamous St. Francis Dam, which failed in 1928. Overall, there have been a least 460 deaths from dam failures in California.

Disaster Type Characteristics – Cont'd



Earthquake Characteristics


- Shockwaves
- Movement along fault lines
- Aftershocks



Typical Day in California - USGS Map


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Earthquake Debris

- Construction & demolition materials
- Human remains
- Personal property
- Animal carcasses
- Household hazardous waste
- Metals
- White metals
- Landslide debris
- Electronic debris
- Vehicles/Rvs/Boats




Loma Prieta - October 1989

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Earthquakes

- Characteristics:
 - Shockwaves
 - Movement along fault lines
 - Aftershocks
- Although relatively infrequent compared to the other disaster types, the effects are usually devastating
- Most large earthquakes occur on the west coast, but other areas of the country are also prone to earthquakes, less common but more dangerous due to ground accelerations traveling farther and due to ill-prepared structures
- Damages include:
 - Building and infrastructure damage
 - Damage to equipment and personal property from collapsed walls and roofs
 - Sediment from earthquake induced landslides
- USACE estimates that a major earthquake in the LA Basin could generate up to 147 million tons of debris



Earthquake Debris Removal Costs

- 1994 – DR-1008 Northridge Earthquake, \$40 billion in total damages
- 2003 – DR-1505 San Simeon Earthquake, \$400,000
- 2010 – Humboldt Earthquake, \$3.8 million in total damages, no debris removal reported
- 2010 – DR-1911 Baja Earthquake, \$1.8 million




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Notable Earthquake Events

- 1994 Northridge Earthquake - \$40 billion in total damages, 57 people died, over 100,000 structures destroyed.
- 2003 San Simeon Earthquake - debris from was minimal. It cost approximately \$400,000 for debris removal from this disaster.
- 2010 Haiti Earthquake - \$14 billion in total damages for this event.
- 2010 – Humboldt Earthquake - \$48 million in total damages, \$12.5 million in debris costs for this event.


Note: After the Northridge earthquake, a retired deputy director for a California city department of public works indicated that the city had an excellent earthquake response with the exception that they did not consider the initial debris clearance in their plans (to remove debris out of the roads). The presence of debris significantly impeded the movement of the emergency traffic.

Disaster Type Characteristics – Cont'd




Fire Characteristics

- Ash
- Extensive burn areas
- Secondary impacts often include Landslides
Erosion of homes, facilities, roads, trees, falling boulders and mudslides from fire fighting efforts or heavy rains after the fire




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Fire Debris

- Ash
- Charred wood waste
- Foundations, bricks, stucco
- Metals
- Personal property
- Human remains
- Hazardous waste
- Vehicles/RVs/Boats
- Animal carcasses




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Fire


- Characteristics:
 - Extensive burn area
- Damages resulting from fires include:
 - Loss of vegetation
 - Damaged homes and buildings

- o Landslides and mudslides on burnt slopes when rains follow the fire
 - Fires can produce a significant amount of debris with the increase of houses in woodlands
 - Secondary Impacts: landslides, erosion of homes, facilities, roads, trees, falling boulders and mudslides from firefighting efforts or heavy rains after the fire.
-



**Fire
Debris Removal Costs**







- 1991 – DR-919 East Bay Hills Fire, \$1.7 billion in total damages
- 2003 – DR-1498 2003 So. Calif. Fires, \$13.2 million
- 2007 – Angora Fire, \$7.2 million
- 2007 – DR-1731 2007 So. CA Fires, \$52.3 million
- 2008 – DR1810 2008 So. CA Fires, \$5.7 million
- 2008 – EM-3287 2008 Mi-Year CA Fires, \$1 million

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Notable Fire Events

- 1991 – East Bay Hills Fire – 354 homes & 456 apartments were destroyed, 25 people died, damages costs were approximately \$1.7 billion.
- 2003 – Southern California Wildfires – 3, 616 structures destroyed, 21 people died, debris costs were approximately \$13.2 million.
- 2007 – Angora Fire – 276 structures destroyed, debris costs were \$7.2 million.
- 2007 – Southern California Fires - 2700 structures destroyed, 9 people died, debris costs approximately \$1.7 million.
- 2008 Southern California Fires – 864 homes destroyed, debris costs approximately \$5.7 million.
- 2008 Mid-Year California Fires (Lightning Complex) – 470 homes destroyed, debris costs approximately \$1 million.

Disaster Type Characteristics – Cont'd

Hurricane/Tornado Characteristics		Hurricane/Tornado Debris
 Hurricane <ul style="list-style-type: none">• High velocity winds• Storm surge• Wave action• Inland flooding  <small>California Emergency Management Agency</small>	 Tornado <ul style="list-style-type: none">• High velocity winds• Narrow path• Length – up to several miles  <small>Disaster Debris Management</small>	 Hurricane/Tornado Debris <ul style="list-style-type: none">• Construction & demolition materials• Vegetation• Metals• White metals• Household hazardous waste• Animal carcasses• Electronic debris• Foundations• Wood• Wallboard• Carpeting• Vehicles• Boats/RVs  <small>California Emergency Management Agency</small> <small>Disaster Debris Management</small>

Hurricane/Tornado

High winds and sudden gusts are the typical cause of damage. This can include, but is not limited to:




- trees
- roofs
- downed power lines

California does not, as a rule, have much experience with hurricanes or tornadoes but they are by no means rare events. From 1950 through 2004 there were 303 documented tornadoes in California. In addition, since 1993, there have been 57 waterspouts in the state's coastal waters. California averages six tornadoes and 5 waterspouts a year. In 2005 there were 20 tornadoes, including 12 in Sacramento County – more than the Oklahoma City metro area for that year.

While 80% of the state's tornadoes are weak, (F-0 or F-1), there have been a number of them occurring in populated areas. Los Angeles County ranks as the tornado capitol for the state with 41 tornadoes, five of these were ranked as an F-2. Orange County had 28 and almost as many waterspouts.

In addition, high winds along coastal areas can result in storm surges and wave action that may cause damage and flooding. This can lead to sediment deposits and debris associated with flooding.

Disaster Type Characteristics – Cont'd

 Ice/Snow Storm	
Characteristics	Debris
<ul style="list-style-type: none">• Restricted access• Power outages	<ul style="list-style-type: none">• Vegetative debris• Animal carcasses
	
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Ice/Snow Storms


- Characteristics:
 - o Restricted access
 - o Power outages
- Ice storms & severe snowstorms often cause similar problems as hurricanes
 - o Significant damage to vegetation
 - o Travel is difficult – roads may be closed as a result of fallen trees and limbs
 - o Power is disrupted and not easily repairable – utility poles and wires may be severely damaged and become debris
 - o Continued cold weather may impede restoration of utilities
 - o Combined with snow accumulation and rapid warming, flooding may occur
- Communities susceptible to ice storms must plan for extensive vegetative debris removal and reduction

Disaster Type Characteristics – Cont'd




Civil Unrest/Terrorist Acts Characteristics

- Burning structures, cars
- Broken glass
- Destroyed buildings
- Explosions
- Fires
- Biological attack
- Contamination
- “Dirty” bomb




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Civil Unrest/Terrorist Acts Debris

- Personal property
- Charred wood waste
- Construction & demolition materials
- Hazardous waste
- Contamination – chemical/biological
- Radiation
- Metals
- White goods
- Electronic debris



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Civil Unrest/Terrorist Act


These two events have similar characteristics and debris, but usually occur for different reasons.

- Civil Unrest Characteristics:
 - o Burning structures, cars
 - o Broken glass
 - o Destroyed buildings
 - ♦ Usually spontaneous
 - ♦ Can quickly get out of hand
 - ♦ Starts at one location and spreads out
 - ♦ Emergency responders often become targets
 - ♦ Crime scene investigation can become necessary
- Terrorist Act Characteristics:
 - o Explosions
 - o Fire
 - o Chemical/Biological Attack
 - o Contamination
 - o “Dirty” Bomb
 - ♦ Little or no warning
 - ♦ Usually high-risk targets (government sites, airports, popular landmarks, utilities, cyber-space, postal service, nuclear plants)
 - ♦ Emergency responders often become targets
 - ♦ Crime scene investigation can become necessary
- Secondary Impacts: Flooding from fire fighting efforts

Notable Civil Unrest Events


- 1992 Los Angeles Civil Unrest - three days of disorder killed 55 people, injured almost 2,000, led to 7,000 arrests, and caused nearly \$1 billion in property damage, including the burnings of nearly 4,000 buildings.

Disaster Type Characteristics – Cont'd



Volcano Characteristics

Characteristics	Debris
<ul style="list-style-type: none">AshLavaPyroclastic flowsLaharsDamaged structuresDowned treesDamaged roads	<ul style="list-style-type: none">AshCharred wood wasteFoundationsBricksMetalsPersonal property




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Volcano

- Characteristics:
 - o Ash
 - o Molten Rock
 - o Damaged Structure
 - o Downed Trees
 - Secondary impacts: Earthquakes, landslides, erosion of homes, facilities, roads, trees, falling boulders and mudslides from fire fighting efforts or heavy rains after the fires
-



California Volcanoes



- 23 separate volcanic areas in the state, over 500 volcanic vents
- Cascade Range volcanoes are known as explosive volcanoes
- Three most watched volcanoes in state:
 - Long Valley Caldera (#2 in nation)
 - Mt. Lassen
 - Mt. Shasta



Lassen Peak, May 22, 1915

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California Volcanoes

Within the State of California, 23 separate volcanic areas and more than 500 volcanic vents have been identified. California volcanoes demonstrate great variety in their types and in their geologic settings; potential volcanic hazards within the State vary accordingly. Therefore it is safe to say, that a volcano in California will erupt again.

The tectonic settings of volcanic centers range from subduction-related volcanism in the northern part of the State (Mount Shasta and Lassen Peak), to volcanism related to crustal stretching and thinning along the Sierra Nevada escarpment (Mono-Inyo volcanoes and Long Valley caldera), to volcanism in an area

of active crustal spreading in the Salton trough (Salton Buttes rhyolite domes). Past eruptions within the State have run the gamut from small basaltic eruptions through catastrophic caldera-forming eruptions of rhyolite such as the one that formed the Bishop Tuff (Long Valley Caldera) about 700,000 years ago; virtually every known type of eruptive activity has occurred within California.

In 1973, a very conservative estimate indicated that losses in California due to volcanic eruptions could amount to \$50 million. The results of the 1980 Mount St. Helens eruptions, however, suggest that far greater losses are likely from even small future eruptions in California. Eruptions of Mount St. Helens in May and June 1980, that were small in volume relative to possible future events in California, resulted in estimated short-term losses to the economy of Washington State of \$970 million.

Debris from a volcano is often the cause of damage in and of itself. A debris avalanche is a sudden and very rapid movement of a mass of rock and soil mobilized by gravity. The debris flows in a dry or wet state and commonly originates in massive rockslides. A debris avalanche that occurred at Mount Shasta between about 300,000 and 360,000 years ago traveled more than 32 miles from the summit of the volcano, covered more than 243 square miles, and had a volume of at least 56,700 cubic yards. The Mount Shasta debris-avalanche deposit covers roughly 10 times the volume of the Mount St. Helens avalanche deposit.

Active Volcanic Areas

Mount Shasta – Mount Shasta has erupted, on the average, at least once per 800 years during the last 10,000 years, and about once per 600 years during the last 4,500 years. The last known eruption occurred about 200 years ago. Most of these eruptions produced large mudflows, many of which reached more than 30 miles from Mount Shasta. Future eruptions like those of the past could endanger the communities of Weed, Mount Shasta, McCloud, and Dunsmuir, located at or near the base of Mount Shasta.

Lassen Peak – 1914-1917: a series of small explosions that began on May 30, 1914, was followed 12 months later by extrusion of lava from the summit and a destructive pyroclastic flow and lahars on May 21, 1915. The fall of fine ash was reported as far away as Elko Nevada, more than 800 miles east of Lassen Peak. Intermittent eruptions of variable intensity continued until about the middle of 1917.

Areas of high relief within the Lassen volcanic center such as the Lassen Peak dome could also collapse and generate rock falls and/or debris avalanches that could endanger areas within about 16 miles of the source.

Long Valley Caldera - All but three of the 20 or so eruptions over the past 5,000 years have been explosive in nature. Those three were of the effusive, Hawaiian type (the Red Cones eruptions south of Mammoth Mountain about 5,000 year ago, the Negit Island eruption about 2,000 years ago, and the Paoha Island eruption just 250 years ago). All have been small to moderate in scale. In 1990, it was noted that trees in an area of about 170 acres have been killed by carbon dioxide (CO₂) emissions. Today concentrations of CO₂ are so high, that children and pets should not enter any natural collapse pits nor dig up loose material from the pits. Also in winter, CO₂ levels can develop in tree wells, around buildings and immediately below the snow in these high emission areas.

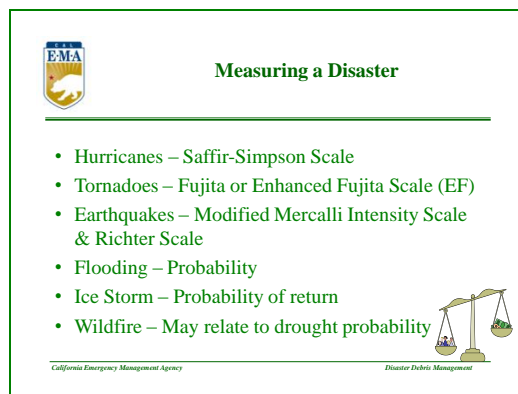
Clear Lake and Sonoma volcanics - Are the less-than-5-million-year old components of a northwesterly youngling line of volcanic. All these volcanics lie within the San Andreas fault system, which appears to have provided magma access to the surface. These volcanics are among the closest to a subduction plate

boundary of any in the world and will repay closer tectonic investigation. Apparently leakage of basalts along the San Andreas Fault system has occurred repeatedly.

Medicine Lake - A sleeping giant, is the largest volcano in the Cascade Range. Filling up the entire southern skyline, it has been erupting off and on for half a million years. The eruptions were gentle rather than explosive like Mount St. Helens, coating the volcano's sides with flow after flow of basaltic lava. This created a shield-shaped mountain approximately 150 miles around the base and 7900 feet high. Medicine Lake is part of the old caldera, a bowl-shaped depression in the mountain. It is believed that the Medicine Lake volcano is unique, having many small magma chambers rather than one large one.

Coso Volcanic Field - It is well known as a geothermal area. A multi-disciplinary program of geothermal assessment carried out in the 1970s defined a potential resource of 650 megawatts electric with a nominal life span of 30 years. Commercial development beginning in the 1980's resulted in the startup of a geothermal steam-driven 3-MW electric power plant in 1987. Highway 395 crosses the west side of Coso volcanic field at the village of Little Lake, approximately 34 kilometers north of Inyokern, California. Most of the field is a few to several kilometers to the east, within the China Lake Naval Weapons Center.

Disaster Intensity Scales



Disaster Intensity Scales have been developed for hurricanes, tornadoes and earthquakes that relate the intensity of an event to the anticipated type and magnitude of damage.

Saffir-Simpson Hurricane Scale

The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's present intensity. This is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on the slope of the continental shelf in the landfall region. All winds are using the U.S. 1-minute average.

- Category 1 hurricane has lighter winds compared to storms in higher categories. A Category 4 hurricane would have winds between 131 and 155 mph and, on average, would usually expected to cause 100 times the damage of a Category 1 storm.
- Depending on the circumstances, less intense storms may still be strong enough to produce damage, particularly in areas that have not prepared in advance.
- Hurricane-force winds can easily destroy poorly constructed buildings and mobile homes. Debris such as signs, roofing material, and small items left outside become flying missiles in hurricanes. Extensive

damage to trees, towers, water and underground utility lines (from uprooted trees), and fallen poles cause considerable disruption.

- High-rise buildings are also vulnerable to hurricane-force winds, particularly at the higher levels since wind speed tends to increase with height. It is not uncommon for high-rise buildings to suffer a great deal of damage due to windows being blown out. Consequently, the areas around these buildings can be very dangerous.

Fujita Tornado Scale

The Fujita Tornado Scale is a scale of wind *damage* intensity in which wind speeds are inferred from an analysis of the damage from the wind.

- Tornadoes are one of nature's most violent storms. In an average year, about 1,000 tornadoes are reported across the United States, resulting in 80 deaths and over 1,500 injuries. A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of one mile wide and 50 miles long.
- Tornadoes come in all shapes and sizes and can occur anywhere in the U.S. at any time of the year. In the southern states, peak tornado season is March through May, while peak months in the northern states are during the summer.
- Most tornadoes spawned by tropical cyclones are relatively weak (F0-F1), but more than 20% have been F2 or F3 and have caused considerable damage. Ten percent of all hurricane deaths are caused by tornadoes.

Enhanced Fujita Scale

In 1992, Dr. T. Theodore Fujita recognized that improvement was necessary. He updated the Fujita Tornado Scale to include an estimate of f-scale damage, thus the creation of the EF Scale.

The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage. It uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators. These estimates vary with height and exposure. **Important:** The 3 second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, "one minute mile" speed.

Modified Mercalli Intensity Scale

The Mercalli Scale is based on observable earthquake damage. From a scientific standpoint, the Richter scale is based on seismic records while the Mercalli is based on observable data, which can be subjective. Thus, the Richter scale is considered scientifically more objective and therefore more accurate. For example a level I-V on the Mercalli scale would represent a small amount of observable damage. At this level doors would rattle, dishes break and weak or poor plaster would crack. As the level rises toward the larger numbers, the amount of damage increases considerably.

The Mercalli Scale is a scale of 12 increasing levels of intensity and ranges from imperceptible to catastrophic destruction. It is an arbitrary ranking (not mathematical) based on observed effects after an earthquake has occurred. Lower numbers generally deal with the manner in which people feel the earthquake. Higher numbers are based upon observed structural damage.

Richter Scale

The Richter Scale is not used to express damage but to express energy release. It is a mathematical equation that is determined from the logarithm of the amplitude of waves recorded by seismographs. The magnitude is then expressed in whole numbers and decimal fractions. Each whole number step in the scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number.


Other Disaster Types

Other disaster types also have some measure of intensity:

- Flooding: Normally identified by probability. For example, reference to a 100-year flood represents a 1% probability of occurring in any one year.
- Ice Storms: Less defined but some areas do maintain records on return periods.
- Wildfires: Difficult to affix a scale but some relate wildfire potential to drought probability or available fuel.

Debris Types and Issues

Debris Types – Vegetation & Sediments	
Vegetation	Sediment
<ul style="list-style-type: none">• Leaves• Branches• Limbs• Uprooted trees & shrubs	<ul style="list-style-type: none">• Mud• Dirt• Rocks• Sand• Sandbags



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As indicated earlier, many of the debris types will be generated by more than one disaster type, however, the magnitude and mix of the debris will vary between disasters.

Vegetation

- Trees.
- Brush.
- Limbs.
- Vegetative debris will be generated from most disaster types.
 - o Hurricanes and Tornadoes - significant quantities.
 - o Floods.
 - o Wildfires.
 - o Ice Storms – some of the largest amounts of vegetative debris come from ice storms.
- Vegetative debris quantities.
 - o May run as high as 70% of the total amount of disaster debris – as with Hurricane Floyd in North Carolina in 1999.

- Vegetative debris will be found both on public and private property, and will be found within streets, often blocking vehicle traffic.
 - o Debris within streets must be cleared quickly to allow movement of emergency vehicles.

Sediment

- Sediment and sand will result primarily from flooding events (floods and hurricanes).
 - o Areas with unconsolidated or loose soil material may become almost a river of sediment during flood conditions.
 - o Sediment flow conditions can be highly destructive and dangerous.
- Wildfires and earthquakes may also generate landslides and mudslides, resulting in the deposits of sand and rocks.
- Sediment flow combined with high velocity floodwater may cause extensive structural damage – both the sediment and structural debris will require disposal.

Note: Sandbags (Sediment) used to protect against flooding remain after floods recede must be handled cautiously – they can be contaminated with pollutants from flooded sewage treatment plants, pesticides, herbicides, chemicals and hydrocarbons. The sandbags must be tested and disposed of properly.

Debris Types and Issues – Cont'd

Debris Types – Construction & Demolition

Acrylic	Drywall	Mirrors	Wood
Asbestos	Electrical	Tiles	Vinyl
Asphalt	Glass	Pipes	
Blinds	Insulation	Plastics	
Bricks	Light bulbs	Rubber	
Carpets	Masonry	Rebar	
Concrete	Metals	Utility poles	

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Construction and Demolition (C&D)

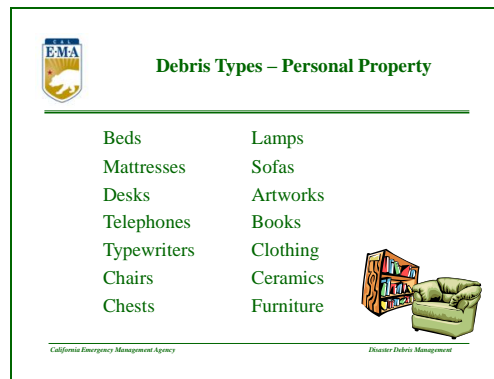
C&D debris is generated by damaged structures and can be present in most types of disasters to varying degrees (hurricanes, tornadoes, floods and earthquakes).

- C&D materials may include both building construction materials and contents (office equipment, personal property, etc.).
- Some C&D materials can be recycled but most will require disposal.
- The structure's use and building materials must be evaluated to consider the potential presence of asbestos and other potentially hazardous materials.

Utility Systems

- In addition to building damage, construction debris may include utility systems such as utility poles, wiring, conduits and other items from power, telephone, Cable TV and other utilities.
 - o These damages should be expected in all types of disasters, with a significant concentration from ice storms.
 - o It is necessary to coordinate closely with appropriate utility companies to define jurisdictional responsibilities and to encourage cooperation to expedite recovery.
- Charred wood and construction materials are a significant portion of wildfire debris, and may also result from earthquake or other disaster induced fires.
- Charred materials may require different handling and disposal.
 - o Resulting materials are often a mix of the building construction materials and contents, including asbestos and other hazardous material, but their presence may not be readily identifiable.
 - o Burned asphalt often is included in this mix.
 - o Must look at the method of disposal to determine how various possible components of this mix may be accounted for and paid for.
- Even if removal is the responsibility of the private landowner, the local community must consider its disposal.
- Destroyed homes will result in significant quantities of debris – C&D and contents. Building materials blown into roadways and yards may include lumber, shingles and other building materials.
- Local ordinances should require homeowners to have their private contractors haul any debris resulting from the demolition and/or rebuilding process to be taken directly to the landfill and should be paid for from insurance proceeds, when available.
- This will result in large quantities of mixed debris.
 - o Debris becomes mixed by:
 - ♦ Uncontrolled collection and disposal.
 - ♦ Disaster effects such as high winds from hurricanes and tornadoes.
 - o Roadside debris piles often contain a mixture of debris types.
 - o Separation of the mixed debris is often not cost effective. Most often the debris is taken directly to the landfill.
- The metal frames, light metal porches and outbuildings may be suitable for metal recycling efforts.


Debris Types and Issues – Cont'd



Personal Property


- Household furnishings and personal effects will become debris as a result of many disaster types.
 - Hurricanes and Tornadoes from wind damaged residences.
 - Flood effects after the water recede.
 - Earthquakes from damaged structures.
 - Wildfires from burnt homes and structures.
- If residents do not have sufficient time to move contents, as would be the case in tornadoes, flash floods and earthquakes, the quantities of personal effects will be significant.
- Quantities increase when roofs are damaged during rain events.
- Household furnishings normally makeup the second wave of debris that will come to the right-of-way.
- Rugs, furniture, and mattresses should be treated as mixed debris and taken directly to a landfill.
- White goods, such as refrigerators, stoves, washers, dryers, etc. should be segregated and recycled if possible. Care must be exercised to ensure that Freon is removed from cooling units by a certified air-conditioning technician.
- Removal of vehicles and boats should be the owner's responsibility to remove and dispose of.

Debris Types and Issues – Cont'd



Debris Types – Metals

White Metal (Appliances)	Metals
<ul style="list-style-type: none">• Washing machines• Dryers• Refrigerators• Stoves• Hot water heaters• Furnaces	<ul style="list-style-type: none">• Frames• Metal porches• Sheds• Roofing• Siding• Fencing• Propane tanks



California Emergency Management Agency Disaster Debris Management

White Metals (Appliances)

White metals may include:

- Refrigerators.
- Freezers.
- Washers.
- Dryers.
- Care must be exercised to ensure that Freon is removed from cooling units of refrigerators, freezers and air conditioners; experts should do this.

Metals

- Metals debris may include:
 - o Roofing.
 - o Mobile homes.
- Some metals might be suitable for recycling.

Debris Types and Issues – Cont'd



Debris Types – Hazardous Waste

Household	Other
<ul style="list-style-type: none">• Cleaning agents• Oils• Paints• Fertilizers• Pesticides• Solvents• Ammunition	<ul style="list-style-type: none">• Radiological material• Biological toxins• Chemicals• Animal carcasses• Asbestos



California Emergency Management Agency Disaster Debris Management

Household Hazardous Waste

Household hazardous waste (HHW) is usually the stuff that's kept under the sink, in the garage and/or shed.

- HHW can result for any type of disaster that results in damage to a residence.
- HHW may be mixed in with personal property debris.
- Every effort should be made to segregate HHW from the debris stream at the curbside, as these materials require special handling and disposal.
- HHW includes such items as:
 - o Paint.
 - o Solvents.
 - o Cleaning supplies.
 - o Insecticides.
 - o Pool chemicals.
 - o Propane tanks.
 - o Gasoline.
 - o Oils.

Hazardous Waste

- Use experts for removal, transportation & disposal.

Human Remains

The remains of many people are unaccounted for and many are still trapped in the rubble. Recovery of human remains in a dignified and respectful manner must be integrated with the debris stream processing. Remains should be recovered at the rubble site to the maximum extent practical. However, human remains may be encountered either at the disaster debris collection point or at a debris processing / staging site where transported debris is separated and processed. It should be noted that animal remains pose similar health hazards, and that the same safety and health requirements should be applied as appropriate when handling animal remains. More information can be found in Appendix A – USACE Human Remains handling.

Crime Scene Debris Removal

It is essential for public safety, and for purposes of crime scene investigation that the site of a terrorist incident is secured during the initial response, and maintained during the recovery operation. Local governments must establish methods to be utilized at a crime scene that focus on law enforcement concerns such as site security and the safeguarding of evidence. The early response phase of a critical incident must prioritize public safety and responder safety. The scene and the evidentiary possibilities must be safeguarded while simultaneously protecting the health and safety to the public and to the first responders.

See Appendix B for a document prepared by the federal Department of Homeland Security. It was created from interviews conducted with personnel who responded to the Alfred P. Murrah Federal Building Attack, including FBI, Oklahoma City, OK Fire Department, and State of Oklahoma Division of Emergency Management. March 9-10, 2005. While the emphasis of this section is focused on a Weapon

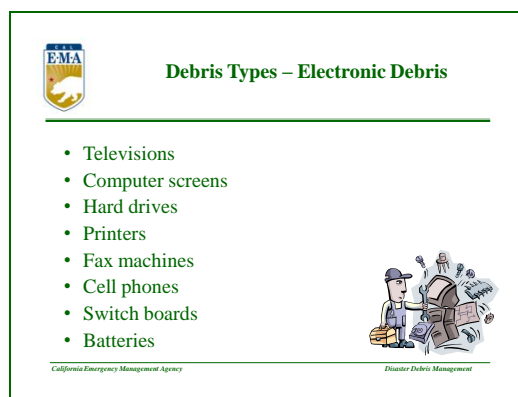
of Mass Destruction (WMD) incident, it is applicable to other terrorist events where debris is part of a criminal investigation.

Animal Carcasses

It should be noted that animal remains pose similar health hazards found in the recovery of human remains, and that the same safety and health requirements should be applied as appropriate when handling animal remains.

- Often times, a storm will cause a farmer to not have access to the animals, which can cause additional deaths.
 - Farmers and/or animal owners should be responsible for the disposal of their animals, but when large numbers of animals are affected, it may be beyond the means of the farmer to properly dispose of the animals.
 - Additionally, particularly in floods, animals may have washed into trees and onto public and private property. To determine ownership of these animals would often be impossible.
 - In large-scale events, wild animals could also be a problem for collection as well as disposal.
 - Disposal of animals presents an environmental/health issue.
 - o The health and safety of those doing the cleanup as well as the citizens at large must be considered.
 - o Long-term environmental impacts of its disposal must be considered.
 - o The traditional method for disposal is burying. However, for large numbers, this may present a health issue. Composting and incineration are also effective means of disposal, but must be evaluated against environmental regulations. (See CalRecycle website for further information.)
-

Debris Types and Issues – Cont'd




Electronic Debris

Electronic debris will result from many disaster types. In the past, batteries from radios, cell phones, flashlights, etc., were tossed into the waste stream without pause. Today, this and other types of electronic debris are pulled out and disposed separately. In fact, many landfills charge an additional fee for this debris type.


- If residents do not have sufficient time to move, as would be the case in of fires, earthquakes, flooding, tornadoes, the quantities of electronic debris could be significant.
 - Is usually mixed in with personal property and C&D debris.
 - Care should be exercised with this debris as some building materials are hazardous Electronic debris should be separated and disposed of in designated landfills.
-

Critical Debris Issues




Critical Debris Issues

- Types of potential disasters
- Estimated quantities and types of debris
- How it will be:
 - collected
 - stored
 - reduced
 - disposed




California Emergency Management Agency Disaster Debris Management



Critical Debris Issues – Cont'd

- Identification of responsible agencies
- Capabilities of in-house resources
- Identification of work to be contracted
- Identification of applicable environmental and historic laws
- Requirements for state/federal funding



California Emergency Management Agency Disaster Debris Management

To effectively manage debris activities, it is important to identify and address critical debris issues, including:

- What type of disasters should be planned for in this community?
- How much and what types of debris can be generated in these events?
- How will the material be collected, stored, reduced and disposed of?

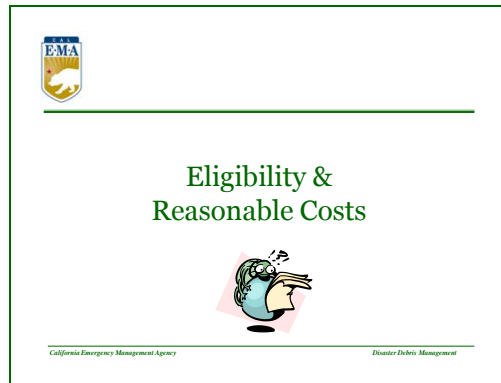
Additionally, the community must identify how the work will be organized, performed and managed.

- Identify agencies available to assist in the debris efforts and what their responsibilities will be.
- Identify the capabilities of in-house resources and how they can best be used.
- Identify the types of work that should be contracted.
- What types of contracts will be most appropriate for the type of work?
 - o Identify the Federal, State and local environmental and historic preservation laws that might apply to the anticipated work.
 - o Identify the types of documentation that may be required to support state/federal funding.
- Consider state/federal requirements for public assistance funding.

ELIGIBILITY & REASONABLE COSTS

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Eligibility & Reasonable Costs



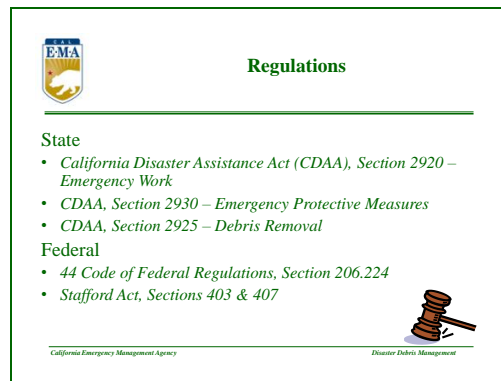
Large debris generating events often result in a State and/or Presidential declaration of a major disaster wherein Cal EMA/FEMA may provide supplemental assistance for eligible debris related activities to those communities declared in the disaster.

Local Governments should be familiar with state and federal eligibility and reasonable costs guidelines during the planning stage in order to plan for critical issues such as contracting, monitoring and preparing appropriate documentation to support requests for funding.

Although there is not a requirement for communities to consider state and federal guidelines in the Debris Management Plans, a lack of knowledge of state and federal requirements has led communities to loss of opportunities for funding.

- Therefore, this section provides a discussion of:
 - o The resources and tools available for assessing debris-related eligibility issues;
 - o Eligibility issues for various debris activities;
 - o Distinctions between private and public property; and
 - o Activities where participants assess eligibility and reasonable cost issues and incorporate issues into debris planning.
- This section is intended to provide a general introduction to eligibility issues. It is not intended to cover all circumstances that may be encountered in the field. The tools and resources covered in this unit will assist the community in locating applicable laws and regulations relative to situations that may arise.

Regulations



State

The California Disaster Assistance Act (CDAA) governs the eligibility rules for disaster debris removal within the state.

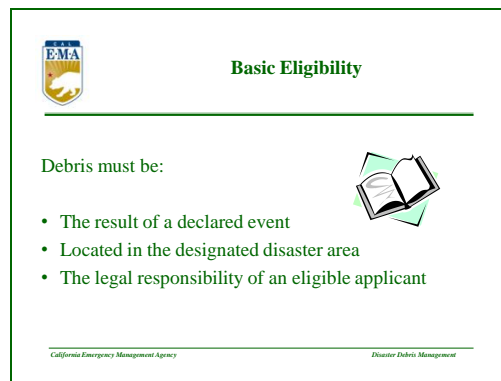
- **CDAA, Section 2920 - Emergency Work**
 - o Emergency work to save lives, protect public health and safety, and to protect property in an area proclaimed to be in a state of emergency.
- **CDAA, Section 2930 - Emergency Protective Measures**
 - o Actions taken to remove and/or reduce immediate threats to public property, or to private property when in the public interest.
- **CDAA, Section 2925 – Debris Removal**
 - a) General Eligibility;
 - (1) Debris removal from publicly and privately-owned lands and waters, undertaken in response to a state of emergency proclamation by the Governor is eligible for state financial assistance; and,
 - (2) For purposes of this program, the removal of debris from private property shall be reimbursed only when there is an immediate threat to public health and safety. In a case where reimbursement for debris removal from private property is authorized by the agency secretary, the following requirements shall apply, unless waived in part or full by the agency secretary:
 - (A) The property owner must remove all disaster-related debris from the property to the curb or public right-of-way;
 - (B) The local agency must obtain a signed statement from the property owner to the effect that the property owner does not have insurance covering the removal of the disaster-related debris; and,
 - (C) The local agency must have a signed statement from the property owner giving the local agency the right of entry and absolving the local agency and the state of any liability relative to removal.

Federal

FEMA and the Public Assistance Program are governed by the law defined in the Stafford Act and regulations provided in Title 44 of Code of Federal Regulations (44 CFR). These laws and regulations provide the criteria for determining eligibility of debris activities.

- **Stafford Act**
 - o Section 403 Essential Assistance;
 - ♦ Basic eligibility for debris removal, clearance of roads, demolition and reduction of immediate threats are all included in this section.
 - o Section 407 Debris Removal;
 - ♦ Debris and wreckage removal from public and private property.
 - o Section 502 Federal Emergency Assistance authorizes Direct Federal Aid for debris removal activities.
- **Regulations 44CFR Part 206**
 - o 206.224 Debris Removal.
 - o Category A Criteria.
 - ♦ Criteria for debris removal from private property, including large lots.
 - o 206.225 Emergency Work.
 - o Category B Criteria.
 - ♦ Emergency Protective Measures criteria used in determining eligibility for demolition. Cost effective measures must be used.

Basic Eligibility



In addition to the debris removal regulations, to be eligible for assistance, activities must satisfy the general work eligibility regulations.

An item of work must:

- Be required as the result of the major disaster event,
- Be located within a designated disaster area, and
- Be the legal responsibility of an eligible applicant.

Public Interest is defined as work necessary to:

- Eliminate immediate threats to life, public health, and safety; or
- Eliminate immediate threats of significant damage to improved public or private property; or

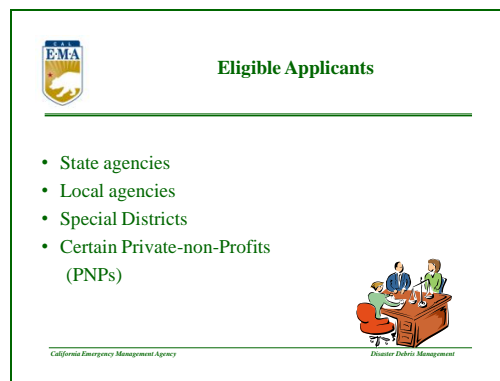
The debris must pose an immediate threat. Debris that would not otherwise result in harm is not eligible for removal.

The eligibility of the activities must address public health and safety. Close attention must be paid to whether or not these conditions are met, especially when considering debris removal from private property.

Under a federal declaration, debris can be removed when necessary to ensure economic recovery of the *community-at-large*. This is generally defined as removing debris from commercial areas to expedite economic recovery. It does not mean general debris removal from private property.

(Note that the **terms *immediate threat, public health and (FEMA only) community-at-large*** are very important in assessing eligibility.)

Applicant Eligibility



State

CDAA § 2900

- Eligible applicant means any local agency (city, city & county, county, county office of education, community college district, school district, or special district).

Federal

44 CFR 206

- Debris removal activities are eligible for both public and Private Nonprofit (PNP) applicants.

Eligibility




Eligible Facilities

- Buildings
- Utilities
- Water control facilities
- Parks & recreation areas




California Emergency Management Agency Disaster Debris Management



Eligible Work

- Eliminates immediate threat to lives and public health & safety
- Eliminates immediate threats of significant damage to improved public or private property
- Ensures economic recovery of the affected community to the benefit of the community at large (federal disasters only – Katrina sized event)



California Emergency Management Agency Disaster Debris Management

For PNP applicants, debris activities are only eligible when they are associated with eligible PNP facilities.

- **For example:** removal of debris from a PNP recreational facility would not be eligible because PNP recreational facilities are not otherwise eligible PNP facilities
- Removal of debris from non-eligible facilities may only be eligible if the work meets the debris removal eligibility criteria (44 CFR 206.224(a)), and is performed by an eligible State, Tribal or local governmental entity.

Debris removal activities by individuals and private organizations (non-PNPs) removing debris from their own property are not eligible. Additionally, eligible applicants cannot be reimbursed for payments they may make to individuals or private organizations for such work. (44 CFR 206.224(c))

Roads

In large debris generating disasters, much of the debris that requires clearance and possible removal in the early stages of the event is that deposited on roadways, thus requiring removal for emergency access. In general, debris on public property that must be removed to allow safe operation of governmental functions or to alleviate an immediate threat is eligible.

Public Roads

- Generally, debris that is blocking streets and highways is considered a threat to public health and safety because it blocks passage of emergency vehicles or it blocks access to emergency facilities such as hospitals.
- Debris may be removed from travel lanes, shoulders, roadside ditches and drainage features, and maintained rights-of-way.

Federal-Aid Systems Roads

- Federal-Aid System Roads are under the authority of the Federal Highway Administration (FHWA). Therefore, FEMA may not provide assistance for activities that would otherwise be eligible by FHWA (Stafford Act Section 312, Duplication of Benefits).

- The FHWA has responsibility for permanent restoration of these roads, and provides some assistance for emergency actions, including debris removal, through their Emergency Relief (ER) program:
 - The ER Program can be authorized if damages to Federal-Aid System roads exceeds \$500,000;
 - A maximum of \$100M per State per disaster is available;
 - Requires a minimum \$5000 per site; and
 - Emergency work, including debris removal, can begin immediately after the event and does not require pre-approval from FHWA.
- The availability of the ER program must be considered before funding debris removal activities.
 - Debris removal from Federal-Aid System Roads is eligible except when the FHWA Emergency Relief (ER) program is activated and the work is eligible for ER funding.
 - The ER program may only grant debris-related assistance for sections of roadway damaged by the disaster. FEMA may fund debris removal from undamaged roadway sections, if it otherwise meets FEMA's eligibility criteria.
 - If the ER program is not activated, FEMA may fund debris removal and emergency activities that meet its criteria.
- The FHWA ER Manual is available through the internet: www.fhwa.dot.gov - U.S. Department of Transportation, Federal Highway Administration, Emergency Relief Manual, Federal-Aid Highways, September 1998.

Water Control Facilities

- Water control facilities naturally collect debris and sediment on a regular basis, requiring maintenance of the facilities to maintain their function.
- Therefore, when evaluating debris removal eligibility from such facilities, it is necessary for the applicant to provide documentation to demonstrate the portion of the existing debris that was generated by the disaster. Evidence of a formal maintenance program and records of the program being implemented is often required.
- Although the applicant may choose to remove all debris, pre-disaster and disaster-related, only the disaster-related debris quantities are eligible, and generally, only that portion that is necessary to remove the threat.

Levees

- Debris removal from permanent levees is eligible for public health and safety, even from levees under authority of the USACE and NRCS.
- Where temporary levees have been constructed as an emergency protective measure, removal of them is eligible only to protect public health and safety or to protect improved public or private property. This may be necessary to open roads.

Dams and Reservoirs

- Removal of debris from dams may be eligible – for example, if debris is blocking a spillway or intake structures.
- Removal of disaster-related debris from reservoirs may be eligible if evidence is provided that the reservoirs were regularly cleaned prior to the disaster and the pre-disaster level can be established.

Debris Basins, Drainage/Irrigation Channels

- Removal of silt, mud and other debris from lined and unlined basins and engineered channels may be eligible if the pre-disaster level of debris can be determined. Such facilities must have a regular schedule of debris removal.

Natural Streams

- CDAA does not fund work done in natural streams, only for man-made facilities.
- Under a federal declaration:
 - Debris removal from natural streams normally is not eligible. Only debris that causes a threat to lives or public health and safety or damage to improved property is eligible.
 - Eligibility is limited to only material that could cause flooding during a 5-year flood.
 - Any work in natural streams must be closely reviewed and monitored to minimize undesirable environmental effects.
 - This work will often require a Clean Water Act Section 404 permit from the USACE.
 - The NRCS also has authority to clear streams of debris.
 - Removal of debris from the banks is generally not eligible.

Buildings

- Removal of mud and silt, or similar disaster-related debris in and on buildings is eligible.
- If furnishings from public buildings are damaged to the point where they become debris, they are eligible for removal and disposal if brought to the curb.
- Sometimes, public facilities are damaged to the point that demolition is necessary for public health and safety.
 - State and Federal policy on demolition must be reviewed for these situations.
- Insurance, also discussed later in this unit, is a large consideration in building debris removal and demolition activities.
- Debris resulting from permanent repair activities is not eligible as Category A, but would be eligible under the permanent repair efforts.

Utilities

- Generally, debris removal from eligible utilities also will be eligible.
- Some materials may be salvageable.
- Environmental issues may be present – such as PCB filled transformers.


Parks and Recreation Areas

- The removal of debris from parks and recreational areas used by the public is eligible when it affects public health or safety or proper utilization of such facilities.
- Damage to publicly owned marinas could include abandoned sunken boats and other debris that may impede navigation.
 - Identified navigation hazards are eligible for removal.
 - Coordination must be made between the US Coast Guard, State Marine Patrol, local government agencies, legal counsel, and contractors specializing in marine salvage operations, commercial

divers and certified surveyors to ensure the hazards are removed safely and efficiently.

- Debris removal from wilderness or unused areas is not eligible.
 - Disaster-related debris on beaches is eligible if the beaches are consistently used for public purposes and a health and safety hazard exists.
 - Recreational facilities are not eligible PNP facilities. Therefore, debris would only be eligible in accordance with the eligibility criteria for private property (discussed later in this unit).
-


Private Property Debris Removal



Private Property Debris Removal

- Authority
CDAA Title 19, Section 2925(2)
44 CFR 206.224(b)
- Eligible only if there is an immediate threat
- Applicants & property owners are aware of responsibilities
- Has been approved by State and/or FEMA before work begins

California Emergency Management Agency Disaster Debris Management



Reimbursement for removal of debris from private property can only be performed under specific circumstances and only with prior state and/or federal approval.

State Regulations for Private Property Debris Removal

Under state regulations, debris removal from private property is reimbursable only when there is an immediate threat to life, public health and safety.

- o Title 19, Section 2925 (2) (A-C)) does allow for the removal of debris under the following:
 - (2) For purposes of this program, the removal of debris from private property shall be reimbursed only when there is an immediate threat to public health and safety. In a case where reimbursement for debris removal from private property is authorized by the agency secretary, the following requirements shall apply, unless waived in part or full by the agency secretary:
 - (A) The property owner must remove all disaster-related debris from the property to the curb or public right-of-way;
 - (B) The local agency must obtain a signed statement from the property owner to the effect that the property owner does not have insurance covering the removal of the disaster-related debris; and,
 - (C) The local agency must have a signed statement from the property owner giving the local agency the right of entry and absolving the local agency and the state of any liability relative to removal.
 - (b) Criteria
Debris removal shall be considered necessary when removal will:
 - (1) Eliminate immediate threats to life, public health, and safety;
 - (2) Eliminate immediate threats of significant damage to improved public or private property, or,
 - (3) Be necessary for the permanent repair, restoration, or reconstruction of damaged public facilities.
 - (c) Examples of Eligible Work.
 - (1) Removing debris such as pieces of destroyed buildings, structures, signs, or broken utility poles;
 - (2) Removing loose or broken sidewalks and driveways; or,

- (3) Removing fallen trees.

Federal Regulations for Private Property Debris Removal

- (Stafford Act Sections 403 and 407 and 44 CFR 206.224(b)) provide the authority to fund eligible applicants to remove debris from private property. This work may only be eligible when:
 - o The disaster caused very severe and widespread damage.
 - o The removal is necessary to eliminate an immediate threat to life, public health and safety or to improve public or private property, or to ensure the economic recovery of the affected community to the benefit of the community-at-large.
 - o An eligible applicant, such as a municipal or county government, performs the work.
 - o The private property owner has provided all insurance information.
 - o It is pre-approved by the FEMA Regional Director and/or Federal Disaster Recovery Manager (DRM).
 - o Required legal documents are in place:
 - ♦ Insurance documents;
 - ♦ Hold Harmless Agreement; and
 - ♦ Right-of-Entry Agreement.
- In federally declared events, applicants and property owners must be aware that only FEMA makes eligibility determinations regarding removal of debris from private property. Not all actions that may be taken by the local governments are eligible for FEMA assistance.

Demonstrating a Threat



Remember, the reason to undertake a debris removal operation is to remove an immediate threat to the public health and safety, not because it's an "ugly nuisance". When it comes to private property, an applicant must demonstrate that removal of debris on private property is required to reduce this threat.

- A *resolution* after a disaster by an applicant that debris on private property constitutes a threat to public health and safety does not in itself make the debris removal eligible.
 - o The applicant should submit for review and approval specific legal requirements for declaring the existence of the threat.
 - ♦ A damaged structure may be a public health and safety hazard if it could be condemned as such, pursuant to the provisions of an applicant's ordinance related to condemnation of damaged structures. A qualified individual, such as a certified building inspector, must make this determination.

- ♦ A public health hazard may exist if such a determination is made pursuant to the provision of an applicant's ordinance related to public health. An individual qualified to do so, such as a public health official, must make such a determination.
 - The determination of work being required to ensure economic recovery must be carefully reviewed.
 - o Use of this criterion is normally restricted to the removal of disaster-related debris from large commercial areas to expedite restoration of the economic viability of the affected community.
-

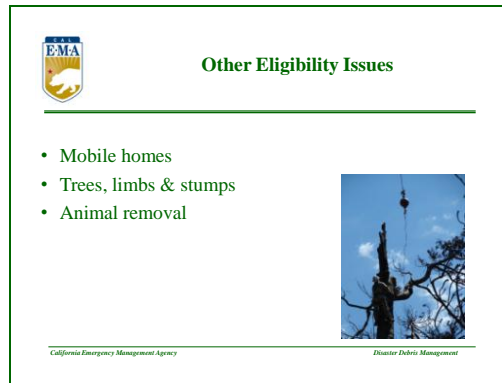
Ineligible Debris



Only disaster-related debris that requires removal to reduce or eliminate an immediate threat is eligible for reimbursement. The following is not eligible for reimbursement:

- Privately owned vehicles, whether or not insured.
- Old white goods located on private property awaiting proper disposal.
- Old tires, batteries, or any equipment/material located on private property awaiting proper disposal.
- Damaged swimming pools, basements and foundations. If it is determined that a public safety hazard exists, FEMA may reimburse the cost of filling these structures.
- Reconstruction debris, sometimes called construction rubble, resulting from reconstruction activities. Removal should be a part of the renovation contract and is to be removed by the contractor.
- Debris that does not pose a threat is not eligible for removal. For example, miscellaneous debris, such as minor vegetation and rubble, is not eligible. Raking of private property to ensure glass and nails are removed is not eligible.
- If an eligible applicant damages private property as a result of eligible debris removal activities, repairs to the property are not eligible unless the damage results in a health or safety risk. Similarly, if private property is damaged by a Federal agency engaged in disaster response activities, the Federal government is not liable for repairs to that property.

Eligibility Issues



Mobile Homes

- In California, the Department of Housing and Community Development oversees mobile homes.
- During many disasters, especially a hurricane or tornado, there may be a large number of mobile homes totally demolished.
- The eligibility for mobile home removal should be evaluated as for any other residential structure - removal may be eligible if a threat can be demonstrated – but there are some unique aspects to the units themselves.
 - o Before demolition begins, the applicant should make arrangements to be sure remaining personal items, furniture, etc. that may remain in the units are removed.
 - o Check the units for asbestos and lead paint, and any other household hazardous waste.
 - o Units may need to be crushed or taken apart – few landfills will accept the units intact.
 - o Caltrans and DOT may have regulations relating to hauling demolished mobile homes on State/federal highways.
 - o Consider salvage of the metal components.

Mobile homes may present unique cleanup situations. Mobile Homes are normally treated as private property and should be removed with the owner's insurance proceeds. However, in some instances, there will be a need to quickly install replacement mobile homes resulting in the damaged mobile home debris being bulldozed to the right-of-way. In addition, mobile homes in a mobile home park are generally not eligible for public assistance as the mobile home park is considered a business.

Trees, Limbs and Stumps

- Hazardous trees, limbs and stumps on public property within or adjacent to improved or publicly used space, and on private property that meet criteria of posing a threat, may be eligible for removal. Examples include:
 - o Trees alongside public roadways.
 - o Trees within a naturalized area of public parks or golf courses.
 - o Trees within private property posing a threat to health and public safety or to damage to residences.
- Hazardous trees that are unstable and leaning into the areas used by the public are eligible for removal. Normally, trees requiring removal are flush cut to the ground.

- A tree with more than 50% of the tree crown destroyed or damaged, a split trunk, or broken branches that expose the heartwood, or a tree that has been felled or uprooted is eligible for removal, especially if it is in a location approximate to or within public-use areas.
 - If an applicant chooses to save a tree that has any conditions described above that justify its removal, the expense is the applicant's.
- Hazardous limbs are also eligible for removal. Hazardous limbs considered to pose a threat are those that are still hanging in the tree and are threatening a public-use area, such as a trail, sidewalk, road or golf cart path, or other improved and maintained property.
- Removal of fallen trees in a forested or wilderness area is not normally eligible.
- Removal of cut trees from subdivisions under development or off the right-of-way in rural areas is typically not eligible, as this condition generally does not pose an immediate threat.
- Reimbursement for stump removal is extremely limited.
 - Normally, reimbursement is limited to removing stumps that have been uprooted, and are located in an area where they would be a safety hazard. If a tree has been broken, instead of uprooted, the "stump hazard" is removed by cutting the tree at ground level.


Note: Angora Fire – 8,552 tons of trees were salvaged for lumber.

Animal Removal

- Disposal of farm and companion animals present unique challenges.
- Local emergency managers need to be involved if extensive numbers of dead animals are found.
- Because of potential health issues, disposal of dead animals needs to be addressed quickly.
- Disposal methods, burning or burying, need to be coordinated with appropriate environmental agencies.
- A specialty contractor may be needed to appropriately pick-up, haul and dispose of the animals.



Note: California Department of Resources Recycling and Recovery (CalRecycle) has lists of renders for various areas on their website (www.calrecycle.ca.gov).

Demolition



Demolition

- Public facilities
- Private structures
- Eligible costs
- Ineligible activities
- Other considerations & checklists



Before
California Emergency Management Agency

After
Disaster Debris Management

State Regulations

Under Title 19, § 2930(4), the agency secretary under the following standards approves demolition of a damaged public facility or privately owned building:

- (A) The local agency must clearly possess the legal authority and responsibility to demolish the damaged facility. The local agency must also show that such demolition does not constitute a “taking” which would require the payment of compensation to the property owner;
- (B) The local agency requesting approval of building demolition of privately owned-buildings must be able to demonstrate that the property owner has no other source of funding to pay for structure demolition;
- (C) The local agency must have inspected each building and determined it to be a health or safety hazard. The local agency must have a certification to this effect signed by the appropriate agency official;
- (D) The local agency must have a signed statement from the property owner to the effect that the property owner does not have insurance covering the damage or the demolition of the building;
- (E) The local agency must have a signed statement from the property owner giving the local agency the right of entry and absolving the local agency and the state of any liability relative to demolition and removal;
- (F) The local agency must also comply with any other applicable state or federal health and safety regulation, law, or general requirements; and,
- (G) Eligibility is limited to the cost of demolishing designated buildings to the top of the foundation, removal and hauling debris to the waste-site, and back filling of basements to a safe condition.

Federal Regulations

Sections 403 and 407 of the Stafford Act allow for the demolition of unsafe public or private structures that pose an immediate threat to life, property, or public health and safety.

- The following is a summary of the key items of the FEMA Policy: Demolition of Private and Public Facilities (FEMA 9523.4) November 9, 1999, included in the Policies Section, and other references.
 - o Public and PNP Eligible Facilities.
 - ♦ Section 403 requires that the structures must be damaged by the disaster.
 - ♦ The structures must be determined to be unsafe and pose an immediate danger to the public. This determination must be made by local officials and verified by State and Federal officials.
 - ♦ Work must be completed within Emergency Work deadlines (44 CFR 206.204 – 6 months plus extensions).
 - ♦ Additionally, Section 407 allows for demolition in the public interest, ensuring economic recovery, but this only applies when the first two criteria above are met to the satisfaction of the Regional Director, and the structures have been uninhabited since the major disaster. The timeline for emergency work completion does not govern this authority.
 - o Private Structures.
 - ♦ The structures must meet the first three criteria defined above for Public and PNP Facilities.
 - ♦ Liability and legal permission requirements must be met.
 - ♦ Slabs or foundations, broken or intact, generally do not present a health or safety hazard to the general public. Slabs removed primarily for reconstruction are not eligible.
 - ♦ Individuals and private organizations (non PNPs) will not be reimbursed for their efforts on their own property.
 - o For health and safety reasons, the following demolition costs are eligible:
 - ♦ Capping wells.

- ♦ Pumping and capping septic tanks.
- ♦ Filling in basements and swimming pools.
- o Not eligible activities include:
 - ♦ Concrete slabs removed for reconstruction purposes, even when brought to the curbside.
 - ♦ Removal or covering of pads and driveways.
 - ♦ Structures condemned as safety hazards before the disaster.
 - ♦ Habitable, but not yet damaged, structures even when they are in serious danger of total destruction (for example, on a failing slope).
- o Section 404 Hazard Mitigation.
 - ♦ When part of the Section 404 Hazard Mitigation buyout and relocation project, the removal of substantially damaged structures including slabs, driveways, fencing, garages, sheds and similar appurtenances are eligible.
- o Insurance must be considered.
- All work must be reviewed in accordance with environmental, historic and other Federal laws.

Other Considerations

Demolition of a structure is not always the most cost-effective health and safety alternative. For example, “attractive nuisances” where structural integrity has not been compromised, cleaning and securing the facility may be the best option.

Curbside Pickup



Generally, disaster-related debris from private property must be brought to the curbside and collected by an eligible applicant.

- Construction and demolition materials from repairs and reconstruction should not be placed at curbside.
- Items such as grass-clippings, household garbage, automobile parts, are not eligible.
- Residents should not mix normal garbage with disaster debris. Normal garbage pickup schedules should resume as soon as possible.
- Segregation of the types of debris will make the process go smoother and faster.
 - o Applicants may be asked to separate their debris into the following categories;
 - ♦ Woody debris and yard waste;
 - ♦ Household waste (damaged personal goods);
 - ♦ Household Hazardous Waste (HHW); and

- ♦ Construction and Demolition (C&D) waste (removed by the homeowner, not as a result of reconstruction).
 - The State, FEMA and/or the applicant should monitor the pickup activities to ensure that eligible materials are being collected and unnecessary mixing of debris does not occur.
 - o The local agencies should work with their State and Federal counterparts to establish deadlines for debris pickup. The residents should be informed as soon as possible of the criteria for pickup, schedule and deadlines.
 - Debris can be removed directly off private property under special circumstances. These instances must be documented.
-

Hazardous/Toxic Waste



Hazardous/Toxic Waste

- Responsibility of the Department of Toxic Substances Control (DTSC) & US Environmental Protection Agency (EPA)
- Eligible activities
 - Household Hazardous Waste
 - Technical assistance
- Ineligible activities
 - Long-term cleanup

California Emergency Management AgencyDisaster Debris Management

Major hazardous and toxic waste components are generally the responsibility of the Department of Toxic Substances Control and the Environmental Protection Agency.

State

The Department of Toxic Substances Control regulates the following within the State:

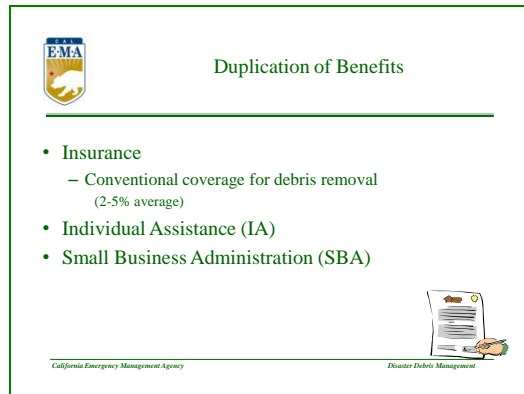
- Regulate asbestos. (This could also fall under the Air Resources Board's jurisdiction, or OSHA's depending on whether the asbestos is being disposed of or ground up.)
- Regulate lead (primarily lead based paint on wood and metal) and household hazardous waste.
- Regulate cleanup on hazardous materials.

Federal

FEMA regulates the following:

- The PAO will coordinate with Cal EMA and FEMA Headquarters at the beginning of a disaster to determine if there have been any agreements with the EPA on addressing HAZMAT for the specific disaster.
 - o For example, FEMA HQ may determine if retrieving and disposing of orphan drums and barrels will be funded by FEMA or through the EPA.
- FEMA generally will fund the removal and disposal of Household Hazardous Waste.
- FEMA may provide technical assistance to States on disposal methods.
- Activities related to long-term cleanup are generally not eligible for FEMA funding.
- State/Tribal/local costs for long-term clean-up measures.

Insurance




In many instances, debris removal for both public and private activities is covered by conventional insurance.

- Check insurance policies to determine coverage for debris removal activities.
- Homeowner's insurance policies often cover structures, fences, and playground equipment.
 - o Usually does not cover vegetative debris.
 - o Homeowners should consider using insurance funds to pay for the removal of debris that is not eligible for reimbursement. This can include:
 - ♦ Concrete slabs
 - ♦ Foundations
 - ♦ Sidewalks
- The responsibility for collecting the insurance coverage, whether it is for public or private activities, rests with the applicant.
- The right-of-entry and release from liability document should include a requirement for the homeowner to forward insurance proceeds to the applicant.

Note: Angora Fire – \$4.2 million dollars from insurance proceeds was recovered under the El Dorado County Insurance Recovery Plan.

Reasonable Costs




Reasonable Costs

State - Title 19, 2900(cc)

- All project costs eligible under section 8680 et seq., of the Government Code, and shared costs of all projects deemed eligible for federal public assistance, after offsetting applicable credits

FEMA – 44 CFR 206.228

- A cost that is both fair & equitable for the type of work being performed



California Emergency Management Agency Disaster Debris Management

The definition of cost eligibility is that a cost must be reasonable and necessary to be eligible.

State - Title 19, §2900(c)

- All project costs eligible under section 8680 et seq., of the Government Code, and shared costs of all projects deemed eligible for federal public assistance, after offsetting applicable credits.

FEMA – 44 CFR, §206.228

- A reasonable cost is a cost that is both fair and equitable for the type of work being performed. Communities often enter into contracts that may not meet the definition of reasonable cost.
- For example: charging \$75/CY for hauling debris is unreasonable when the going rate for similar work in adjacent locations is \$25/CY.
- The reasonable cost requirement applies to all labor, materials, equipment, and contract costs awarded for the performance of eligible work.

Eligible Costs



Eligible Costs

- Force account labor
- Equipment
- Mutual aid
- Volunteers
- Contracts
- Project management & monitoring



California Emergency Management Agency Disaster Debris Management

Local agency costs are eligible for state financial assistance provided these expenditures are directly related to an eligible disaster event.

- Expenditures included in the local agency applications for state assistance must be reasonable and in accordance with the agency's standard cost allocation procedures.
- Funding will not be provided to an agency for damages caused by negligence.

Force Account Labor

To accomplish effective debris clearance in the early stages of the disaster response, an applicant may rely on personnel from various sources to perform or manage the work. The eligibility of this labor may vary per source.

The following wage costs are eligible for state and/or federal financial assistance:

- Personnel costs incurred as a result of the disaster are eligible; however, straight or regular time salaries and benefits of permanently employed staff performing emergency work are ineligible.
- Overtime granted as compensatory time off (CTO) and based on the standard rate (i.e. regular cash rate) for overtime pay.
- Wage additive costs, including retirement contributions, vacation, sick leave and other fringe benefits costs assessed against the regular wage rate of employees engaged in disaster related work activities.
- Seasonally employed personnel, when covered under existing budgets and used for a disaster during the season of employment, are considered permanently employed personnel for the purpose of cost eligibility.
- Temporary employees hired as a direct result of the disaster are eligible for both regular time and overtime pay.
- Local Share - Matching fund assistance for cost sharing required under federal public assistance programs is an eligible cost. PA programs include supplementary federal assistance for local agencies, other than the direct benefit assistance for individuals and families.

Force Account Equipment

The State can authorize reimbursement of certain types of equipment costs:

- Actual equipment rental.
- Equipment costs for applicant-owned equipment, based upon the applicant's own rate schedules, or in the absence of an applicant's rate schedule on current Department of Transportation (CALTRANS) Labor Surcharge and Equipment Rental rates.
- Equipment rates must cover normal costs of lube, repair, overhaul, depreciation, interest, insurance, storage, and taxes. The schedule must also include fuel and oil for self-powered equipment.

FEMA will fund the least costly of the available rates.

- Cost of labor to operate equipment is an additional cost.
- Extraordinary expenses for repairs and maintenance required due to severe conditions in disaster operations may be eligible for reimbursement under FEMA Policy 9525.8, Damage to Applicant-Owned Equipment, dated August 17, 1999 provides criteria for and examples of eligible conditions.

Interagency Assistance/Mutual Aid Agreement, Volunteers

Debris activities may be performed through Mutual Aid Agreements and volunteer organizations.

- Eligible costs include only those reasonable costs invoiced or billed in accordance with reimbursement provisions contained in such interagency agreements.
- Costs for work performed under interagency assistance/mutual aid agreements between local governments or local governments and state agencies, include but are not limited to:
 - o contracts;
 - o cooperative agreements; or
 - o assistance-for-hire agreements.

Contracts

Costs of contractors used to accomplish emergency work are eligible for reimbursement.

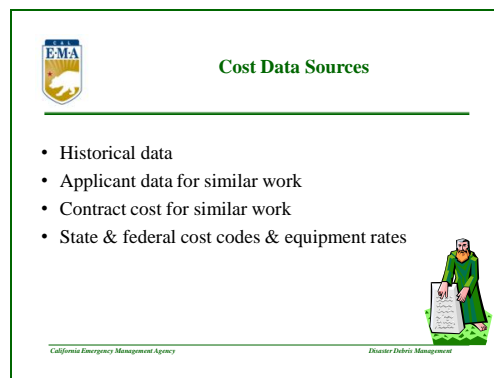
- All work must be bid as required under applicable state or federal laws or regulations or, including 44CFR, part 13, whichever is the more restrictive.
- This topic is covered further in the Contracting Module of the State Disaster Debris Training.

Project Management and Monitoring Costs

It has been found that defining an acceptable percentage to estimate these costs is not appropriate.

- For example: There can be extensive amount of debris deposited in a relatively small area (say from a tornado) that requires minimal project management and a small number of monitors, or the same amount of debris widely scattered (hurricane event) that may require much more management and monitoring.
- Associated costs must be evaluated on a case-by-case basis – considering a reasonable amount of effort of appropriate level personnel. For example: it is unlikely that professional engineers would be necessary to monitor debris operations.

Cost Data Source

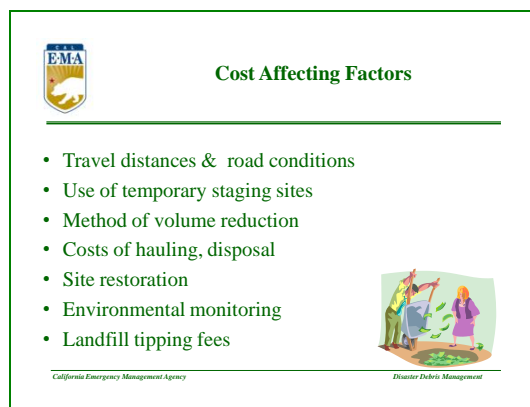


Costs for work to be performed should not be determined arbitrarily. There must be some basis for the reasonableness.

- Costs may be determined by reviewing:
 - o Historical data for similar work – within the locale or region, check previous disasters;
 - o Applicant data for previous similar work (either force account or contract);
 - o Contract costs for similar work being done in the area;
 - o Cal EMA services data; or

- o State and federal cost codes for force account work.
 - Available cost data may need to be adjusted to reflect:
 - o Time frame of the operation – costs may be higher immediately after the disaster but implementation of a bidding process for pickup and disposal should reduce costs; or
 - o Location of the operation – accessibility for debris pickup and disposal.
 - Documenting costs on the Damage Survey Report or Project Worksheet.
 - o Document source and basis of cost; identify factors that result in higher costs.
 - o Check estimates against actual costs if work is underway – use actual quantities and rates when available.
 - o Verify costs and quantities through monitoring.
-

Cost Affecting Factors




Each debris operation has unique aspects that affect the total cost, whether the work is performed by force account or contract.

These factors may include:


- Travel distance.
- Temporary Staging Sites.
- Volume reduction method.
- Hauling and disposal.
- Site restoration.
- Environmental monitoring.
- Security at the Debris Management Site to prevent off-hour dumping.
- Some landfills may have a daily cap on how much waste it can landfill in a day – a special waiver may be needed by Cal Recycle or the Local Enforcement Agency (LEA) to allow emergency debris disposal over the regulated daily cap.
- Tipping Fees.
 - o The Cal Recycle can indicate if there is a regulatory office that approves landfill-tipping fees.
 - o The charging of tipping fees should be consistent, and not waived for some and charged to others.
 - o Waived tipping fees are not reimbursable.

Re-Use and Recycling Markets



Re-Use & Recycling Disaster Debris

- Timber
- Wood debris
- Vegetative debris (mulched)
- Construction & demolition debris
- White metals (appliances)
- Scrap metals
- Recyclables (cans, plastic & glass)



California Emergency Management Agency Disaster Debris Management

Debris generated by a disaster may have a market value. Any revenue generated from debris must be used to offset the project cost.

- Reasonable costs expended by the applicant to administer and market the sale of the materials may be recouped by the applicant from the proceeds.
- If a contract provides for the contractor to take possession of the material in return for lower bid prices, there is no salvage value to be recouped.

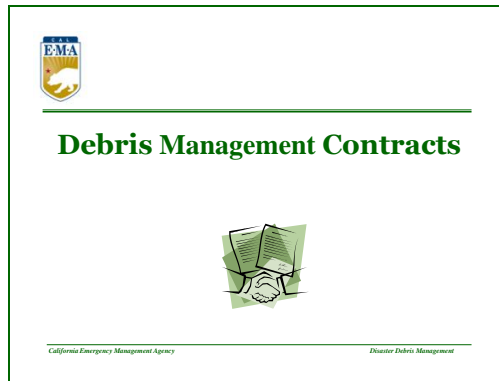
Re-Use and Recycling Markets for Disaster Debris

Debris Type	Use	Markets
Vegetative Debris	Food waste: Compost Trees, branches, leaves: Mulch, landfill cover, fuel	Farms, composting facilities, landslide companies and landfills
Inert Debris	Gravel, backfill, soil amendment, landfill cover	Cement manufacturers, soil amendment/horticultural industries, landscape companies, landfills and construction companies
Construction & Demolition	<p>Asphalt: Recycled asphalt</p> <p>Concrete: Aggregate base, sidewalk backfill, gravel road cap, decorative gravel</p> <p>Construction lumber: Re-use, fuel, bulking agents</p> <p>Construction plastics: Re-use or recycle</p> <p>Drywall: Gunitite mix, soil amendments, new drywall, re-use</p> <p>Carpet: Secondary fibers for recycled content products</p> <p>Metals: Scrap metal</p>	<p>Public works construction contractors, construction companies, asphalt recyclers, public works departments</p> <p>Construction companies, building restoration & repair contractors, cogeneration plants, waste to energy plants</p> <p>Plastics recyclers, construction companies, salvage dealers</p> <p>Drywall manufacturers</p> <p>Carpet recyclers and rag industry</p> <p>Construction companies, metals recyclers, salvage dealers, smelters and steel mills</p>
Personal Property	Repair and re-use	Resale shops, non-profit organizations
Damaged White Goods	Repair and re-use, metals salvaged	Resale shops, repair shops, second hand appliance shops, scrap metal dealers
Damaged Vehicles	Repair and re-use, salvage	Resale, metal salvage yards
Hazardous Wastes	<p>Latex paint: recycle</p> <p>Used motor oil: recycle</p>	<p>Paint manufacturers</p> <p>Motor oil manufacturers</p>
Bi-Metal Containers, Plastic & Glass Bottles, Sand Bags	Recycled	<p>Standard Recycling Markets</p> <p>Cement Manufacturers</p>

Debris Contracting

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Introduction



Communities that fail to comply with proper contracting procedures or enter into inappropriate contracts may experience severe financial consequences.

- Communities may end up paying a contractor for work that was not originally part of the contract
- The period of performance may become excessive such that the work is not completed in a timely manner to meet the needs of the community.
- Lawsuits may result by the community (residents), the contractor, or both.
- If there is a state or federal disaster declaration:
 - o The community may not be reimbursed for all costs incurred, even if payment must be made to the contractor.
 - o There may be delays in funding pending the results of audits, collection of documentation, justification of costs, etc.

Debris Contracting Issues and Responsibilities




If the magnitude of the emergency debris operation is beyond the capabilities of local force account resources, State resources, mutual aid agreements, and volunteer labor and equipment, contracting for labor and equipment may be necessary. Contracted activities may include:

- Debris management planning (*Not eligible if done prior to the disaster*)
- Clearance, removal and hauling
 - o Separate contracts may be prepared for clearance activities and removal and hauling

- Demolition
 - Demolition activities are generally beyond the capability of most communities forces
- Debris Management Sites
 - Overall operations or specific activities
- Recycling or Volume Reduction Activities
- Removal and Disposal of Household Hazardous Waste, Asbestos and other hazardous materials
- Final Disposal
- Monitoring
- Overall Project Management


Note: Project Management costs are sometimes eligible for state and/or federal assistance, but this depends upon the magnitude of the event, the impact to the community, reasonableness of the costs, etc.

Contracting – To be or not to be?



Debris Contract

- Amount and types of debris
- Private property removal
- Debris concentration area
- Debris management site locations
- Landfill disposal site locations
- Task requirements
- In-house capabilities

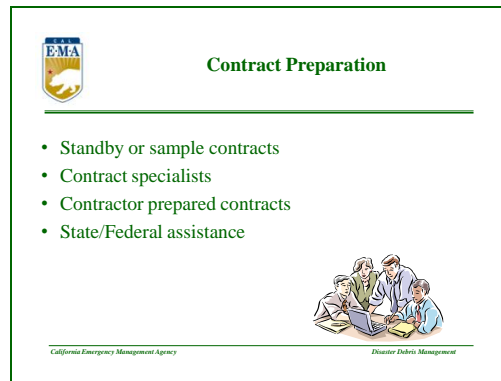


California Emergency Management Agency Disaster Debris Management

With a wide range of possible contracted activities, communities need to anticipate their contracting needs during debris management planning. The community should:

- Assess the potential amount and mix of debris from an anticipated event
- Determine a plan for collecting, hauling and disposing the materials
- Assess the capability of their own forces to perform the work
- Issues to consider in determining if work should be contracted include:
 - Potential quantity and composition of debris – how much and what type
 - Is removal from private property anticipated?
 - How widespread is the forecasted debris, and where will it be located?
 - Where is the location of the debris management sites or landfill disposal sites?
 - Will recycling be done?
 - What are the requirements for accomplishing these activities?
 - What are the in-house capabilities?

Contract Preparation



Prior to a disaster, it is recommended that communities prepare:

- Standby contracts that are pre-awarded executed and ready for implementation
- Sample contracts that are pre-drafted and ready to be finalized, advertised and awarded

Many local governments use a contracting specialist to prepare their contracts. The specialist should:

- Closely coordinate with debris staff to ensure that all technical aspects are correct and the scope of work is appropriate
- Ensure the appropriate type of contract is used for the work to be performed – time and materials, unit price, lump sum (discussed later in this unit)
- Ensure compliance with proper bidding and award procedures
- Be responsible for all contract administration and documentation
 - A complete file of the process should be maintained, including development of the scope of work, a copy of the bid advertisement, summary of bids received, selection process and basis, invoices, memos of meetings, etc.

Often contractors will offer use of a contract prepared by their company. Although this offer may seem attractive in the essence of time, the contract should be reviewed by legal counsel to ensure:

- It is technically and legally correct
- It has proper safeguards for the awarding entity
- The work covered by the contract is eligible for reimbursement
- The payment is not being made for technical advice available free from the State or FEMA. This includes instructions on completing project worksheets, eligibility, contracting, environmental requirements, etc.


While communities may enter into any contracts they wish, Cal EMA and FEMA are not a party to those contracts. These communities are strongly encouraged to work with state and federal personnel to ensure that the costs set forth in the contracts they are considering are eligible for reimbursement.

- To facilitate assistance to communities in this matter, Cal EMA/FEMA staff will be available to provide technical assistance before contract execution to help ensure compliance with the provisions of the PA Program, as well as other applicable statutes and regulations
- If a contract is in-place prior to meeting with Cal EMA/FEMA, the terms of the contract should still be discussed to ensure compliance issues

Regardless of who prepares the contract or provides technical assistance in its preparation, the community is ultimately responsible for the terms of the contract, including:

- The scope of work is accurate and appropriate
 - All documentation is complete and appropriate
 - The work performed is eligible and the costs are reasonable
 - The work is adequately monitored
-

Procurement Requirements




Procurement Requirements Regulations

State - CDAA, Section 2915

- Local agency subject to applicable state laws
- State, or state employee has no responsibility with work done by a local agency

Federal - 44 CFR, Part 13

- Must meet federal procurement standards
- Sole source contract used only in rare instance



California Emergency Management Agency Disaster Debris Management

In large debris generating events, communities often become overwhelmed with the activities to be performed and do not comply with proper procurement requirements. Local governments must comply with all State, federal and local procurement requirements.

State

CDAA, Section 2915

(a) General Provisions

(1) Applicants receiving federal disaster assistance funds must comply with applicable federal contracting and procurement requirements contained in Title 44, Code of Federal Regulations (CFR), part 13, Sections 13.35 and 13.36, and Office of Management and Budget Circulars (OMB) A-102 (Revised 10/7/94, As Further Amended 8/29/97) and A-110 (Revised 11/19/93, As Further Amended 9/30/99). Funds withdrawn by the federal government, due to non-compliance with the applicable federal contracting and procurement requirements shall result in a loss or reduction of state cost-sharing assistance. The state shall not provide additional funding to an applicant to substitute for federal funding withdrawn as a result of noncompliance with federal regulations.

2) Any work performed by a state agency, at the request of a local agency, shall be agreed upon in writing and subject to the state Public Contracts Code. Work performed by a local agency shall be subject to the

laws governing the performance of such work by the local agency and any other applicable state or federal laws. Neither the state nor any officer or employee thereof shall have any responsibility in connection with any work performed by a local agency.

(3) Any contract executed between the local agency and the agency secretary, pursuant to the Act, shall contain a provision under which the local agency agrees to hold the state harmless from damages resulting from the work for which funds are allocated; and

(4) A payment bond is required on all contracts involving expenditures in excess of twenty-five thousand dollars (\$25,000), pursuant to sections 3247 and 3248 of the Civil Code, on any public work for a political subdivision including, but not limited to, improvements and replacements of any building, road, bridge or other structure.

Federal Regulations

- Federal procurement standards must be met, or exceeded, if FEMA assistance is to be requested on Presidentially declared disasters
 - o Title 44 of the Code of Federal Regulations, Part 13 covers grant administration, including procurement and contracting criteria
 - o Normal State and local procurement requirements must still be followed, but such regulations must be at least stringent as the Federal procurement regulations (Part 13)
- To be eligible for FEMA assistance, competitive bidding must be used except for initial emergency situations
 - o Non-competitive (sole source) contracting is acceptable ONLY in rare circumstances where there can be no delay in meeting a requirement, such as for emergency road clearance
 - o Not all “emergency” work requires “emergency” contracting procedures. Competitive bidding normally can be resumed within days of the disaster.
- If the Governor waives contracting procedures because of the emergency that does not necessarily mean competition is suspended. It generally means that time can be compressed. Emergency contracting still may require, or can use, competitive bidding
 - o In the past, many communities have successfully developed a scope of work, identified contractors that can do the work, and made telephone invitations to bids to expedite the process

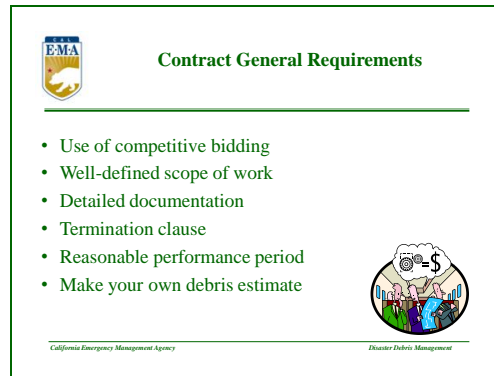
Contractor Selection

For declared disasters, a community PA applicant is not required to select the low bid in the competitive bid process. The community may use their normal bid evaluation criteria in selecting a contractor.

- Under state and federal regulations consideration may be given to the following factors when selecting a contractor:
 - o Contractor integrity
 - o Compliance with public policy
 - o Record of past performance
 - o Financial and technical resources
- In addition, other criteria that may be considered includes:
 - o Cost – ensure costs are reasonable. Costs that appear too low may not actually be attainable by the contractor and problems may arise when the contractor is faced with modifying work procedures to cover costs and maintain profits
 - o Other current obligations/work commitments – is sufficient staff available to complete work in a timely manner?
 - o Proposed work plan

- o References
 - o Use of local resources
-


Contracts – General Requirements



The following are general requirements to be carefully considered and included in debris-related bid documents and final contracts:

- Use competitive bidding
 - o Identify criteria for the work, including
 - ♦ Criteria for responding – time, scope of response
 - ♦ How long between award and time to mobilize
- The scope of work must be well defined and each intended task specifically addressed
 - o Be comprehensive, but concise
 - o Without specific language for each task, the contractor may perform work that was not originally intended, or fail to perform work that must be redefined often at additional cost
 - o For Presidentially declared disasters, eligible work must be clearly defined
- Documentation is a critical component in supporting contractor invoices and in supporting reimbursement
 - o Records should be auditable
 - o Lack of proper documentation can jeopardize or delay funding
- Include a termination for convenience clause – this will provide the community the option to cancel the contract for any reason
- Define a reasonable period of performance
 - o Determine when the work needs to be complete – otherwise, the work may not be performed in a timely manner to meet the needs of the community
 - o Include penalties if the work is not completed within the specified period of performance
- Base the contract on an estimate of debris as prepared by the community staff. Do not rely on contractor estimates

Contract Considerations



Contract Considerations

- Fully document process
- Ensure costs are reasonable
- Monitor operations
- Ensure all contracted activities are required
- Request technical assistance from CalEMA and/or FEMA




California Emergency Management Agency Disaster Debris Management

When state and/or federal funding is involved, or expected:

- Ensure the process is fully documented, including bid advertisement, responses, contract award, etc.
- Ensure the costs are reasonable, and include a justification of costs
 - o Only reasonable costs will be reimbursed
- Ensure the activities are well-monitored and the process of monitoring is documented
- Ensure that all activities included in the contract are required for debris removal, and are eligible for reimbursement


If there are any questions regarding any aspects of the contracting, the community may request technical assistance from the State or FEMA.

Contract Cost Estimating



Contract Cost Estimating

- Means cost data reports
- Local engineering & construction companies
- Historical information
- Local public works department
- State Transportation (Caltrans)
- State Department of Forestry (CDF)




California Emergency Management Agency Disaster Debris Management

To estimate a reasonable cost for a contract, the community may consult the following sources for cost data:

- Publications such as Means Cost Data Reports
 - o Depending upon what is being contracted, these documents may include costs on specific equipment
- Local engineering and construction firms


- o These firms can be employed to develop the cost estimate, or may be willing to provide some basic data
 - Historical data
 - o These data do not necessarily have to be for the same work, as long as the work is similar. It will provide a guide and some justification of costs.
 - Local Department of Public Works
 - o This department usually is involved in contracting for various types of work using the same types of equipment needed in debris-related activities
 - State Department of Transportation (DOTs)
 - o Most DOTs maintain a comprehensive bid tabulation breakdown showing the average price paid for various contracted work
 - State Department of Forestry & Fire Protection
 - o May be able to provide input to the cost estimate
-

Contract Cost Estimating – Cont'd




Contract Cost Estimating – Cont'd

- Type of debris
- Removal method
- Permit requirements
- Work site limitations




California Emergency Management Agency Disaster Debris Management



Contract Cost Estimating – Cont'd

- Site access
- Truck size
- Disposal site distance & route
- Traffic conditions
- Roadway conditions



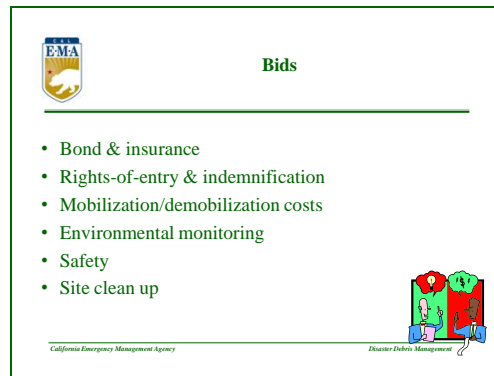
California Emergency Management Agency Disaster Debris Management

When evaluating a reasonable cost for debris-related activities, various factors must be considered:

- Type, mix and amount of debris.
 - o The type and mix of debris will have a significant impact – how much is vegetative, how much is C&D? Is there any asbestos? What about household hazardous waste? Is any demolition required? What special handling and disposal requirements must be considered due to the type and mix?
 - o The amount of debris will affect the cost. Often, but not always, the larger the magnitude of debris, the less the unit cost
 - Method of removal
 - o How will the debris be removed? Front-end loaders and trucks? Is special equipment required?
 - Permitting requirements
 - o Including permits for handling household hazardous waste, to operate Debris Management Sites, for demolition
 - Any limitations at the work site
 - o Work hours may be limited, there may be competitive work going on
 - o In some areas, there is a limitation on truck size. In older cities, with narrow streets, small trucks and other equipment will be required. There will be competition for equipment and highway space, so there may be a lack of available trucks. This is a particular problem in the US Territories
 - Access to the debris, the debris management sites, and the final disposal site
-

- o The type and width of the road may limit the size of equipment that can be used.
 - o Access to the debris management site may be limited by lack of access roads
 - Depending upon the type and amount of debris, the haul distance may be lengthy (or take extensive time)
 - o The closest site was almost 100 miles away. In CA, hauls of over 100 miles have been necessary. Debris from 2007 Fire at Lake Tahoe was taken to locations in Nevada. Debris in Crescent City is taken to Oregon.
 - o Routes may be narrow and winding, increasing haul times
 - It may be necessary to haul the debris through areas of heavy traffic, increasing haul time
 - Roadway conditions may be bad because of the incident, rescue and emergency equipment, and heavy equipment usage
-

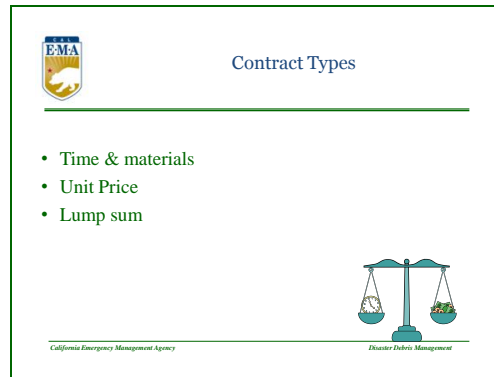
Bids



When preparing bid solicitations, include the following costs or sections:

- Bond and insurance requirements
 - o This is a protection for the community; however, there are costs associated with them
- The requirement for rights-of-entry and hold-harmless agreements to enter private property
- Costs of mobilization and demobilization
 - o In large disasters, these efforts can be quite costly, but are a cost to the contractor
 - o The work includes organizing the equipment, moving it to the site, then doing the reverse
- Environmental monitoring may be required
- Safety requirements must be reviewed, and could increase costs
- Debris management site clearance and cleanup
 - o If a good environmental baseline study is conducted, and a monitoring program is implemented, this should be relatively easy
 - o Section related to state and federal eligibility requirements, and the necessity for the contractor to comply with those requirements

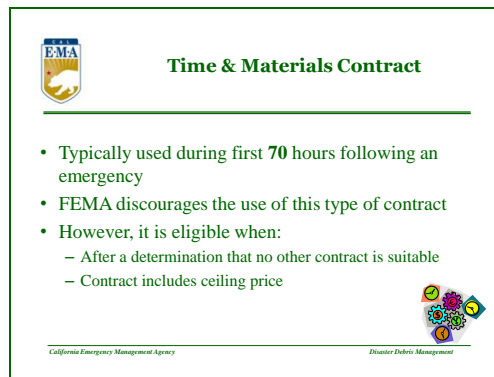
Contract Types



It is important for a community to understand the types of contracts that may be appropriate for various types of work.

- There are three basic types of contracts:
 - o Time and Materials
 - o Unit Price
 - o Lump Sum

Time and Materials Contract



A Time and Materials contract is based on hourly rates for personnel and equipment.

- The contractor is paid an hourly rate for the actual time performing the specified work.
- Bids should include all overhead costs.
- Standby time.
 - o For rental equipment, if determined cost effective by the agency secretary.
 - o Standby time for applicant owned equipment is not allowed
 - o Standby time is not an eligible cost for FEMA reimbursement.

Federal Emergency

- Under federal regulations (44CFR, Part 13.36), time and material contracts can be used when:
 - After a determination that no other contract is suitable, and
 - If the contract includes a ceiling price that the contractor exceeds at its own risk
- Time and Materials contracts may be the most appropriate method of contracting during first 70 hours following an emergency.
 - Generally, in the first 70 hours after a disaster, clearing debris from the roadways for access rather than removing debris to disposal areas is the most important activity a community is involved in with regard to disaster debris activities.
 - Applicants often use a Time and Material contract to perform this work
- All Time and Materials contracts should clearly state:
 - The price for the equipment applies only when the equipment is operating.
 - The hourly rate includes the operator, fuel, maintenance and repair.
 - The community reserves the right to terminate the contract at its convenience.
 - The community does not guarantee a minimum number of hours.
 - The contract has either a dollar ceiling or a not-to-exceed-number-of-hours clause.
 - The hours of operation of the contractor (to ensure monitoring is on-going when the contractor is working and to minimize disruption to the community).

Regarding Presidentially declared disasters:

- To be eligible for federal reimbursement, FEMA would like time and material contracts to be limited to a maximum of 70 hours of actual emergency debris clearance work and should be used only after all available local, tribal and State government equipment has been committed
 - The 70 hours provides time for:
 - ♦ Moving the debris from the roadway to the curbsides or rights-of-way to allow passage of emergency vehicles, and
 - ♦ Negotiating unit price and/or lump sum contracts.
 - If a PA applicant awards multiple time and material contracts, those contracts should run concurrently, not consecutively
 - ♦ The 70 hours begins when the first contract is awarded
- Cal EMA has prepared a Flyer entitled “Debris Contracts” and has been included as a reference document. This document is also available on the Cal EMA website.

Time and Materials Contract – Cont'd



Time & Materials Contract

Advantages	Disadvantages
<ul style="list-style-type: none">Extremely flexibleNot dependent on scopeReady for immediate responseContractor assumes the risk	<ul style="list-style-type: none">Requires close contractor oversight & directionRequires documentation of actual equipment & operator hoursRequires full-time, on site monitors



California Emergency Management AgencyDisaster Debris Management

Advantages:

- Extremely flexible, not scope-dependent
- Has a wide range of uses – clear major access routes or access to critical facilities
- Available for immediate response activities - Is suitable for emergency "hot spots" and early debris rights-of-way clearance

Disadvantages:

- Requires close contractor oversight and direction as to what work to perform
- Requires documentation of actual hours worked by equipment and operators
- Requires competitive bids or negotiated reasonable hourly rates for equipment and operators
- Specifies equipment as generically as possible to encourage competition
- Requires full-time (on-site at all times with the contractor) and trained contract monitors to document actual equipment usage

Unit Price Contract



Unit Price Contract

- Requires full-time trained third party contract monitors
- Requires all trucks to be accurately measured & numbered
- Requires all truckloads to be documented



California Emergency Management AgencyDisaster Debris Management

A unit price contract uses construction units (Cubic Yards, Tons, Each) and prices to develop line item costs and total contract costs.

- The unit price contract should be used when the scope of work is difficult to define. The contract will be based on estimated quantities.
 - There must, however, be specific documentation compiled during performance of the work to support the actual quantity of work completed
 - Therefore, to be properly administered, unit price contracts should have full-time, trained monitors to ensure compliance with contract requirements
-

Unit Price Contract – Cont'd

 Unit Price Contract Advantages	
<u>Advantages</u>	<u>Disadvantages</u>
<ul style="list-style-type: none">• Is flexible• Accurate account of actual quantities removed• Wide range of competition 	<ul style="list-style-type: none">• Segregation of debris complications• All trucks must be numbered, measured & documented• Possible contract fraud 

California Emergency Management Agency Disaster Debris Management

Advantages:

- Is flexible – don't need to get an exact determination of the amount of debris (but a good estimate will provide assurance that total quantities are reasonable – estimate should be determined by the PA applicant, not the contractor)
- Requires accurate account of actual quantities removed in either cubic yards or tons
- Ensures a wide range of competition because of simplicity of contract
- Has a low risk for the contractor (and great advantages if quantities can be maximized)

Disadvantages:

- Proper administration requires dedicated contract monitors at the pickup site and at the disposal site
 - o Collected debris must meet terms of contract and FEMA eligibility criteria
 - o Trucks must be sufficiently loaded
- Has possibility of contractor fraud if loading and dumping operations are not closely monitored
- Is complicated if segregation of debris is required
- Requires all trucks to be accurately measured (for cy payment) or weighed (for ton payment), and numbered – and periodically verified
- Requires all truckloads to be documented. For most accurate accounting, a pre-numbered load ticket should be used. Load tickets are the verification of the estimated quantity of debris in cubic yards or tons deposited at the dumping site.

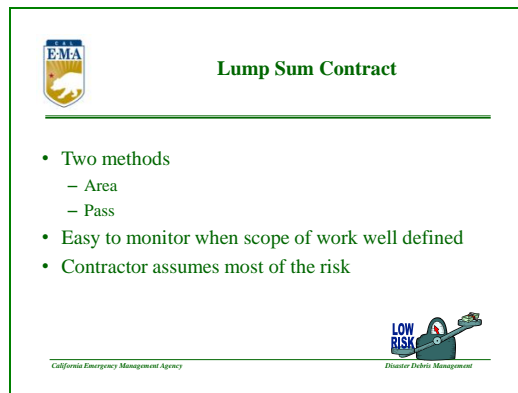
Unit Price Contract Verification



On FEMA projects, unit price contracts will require the PA applicant to have a verification process in place to help them in the documentation for their claim.

- When using volume (cubic yards) measurements, an inspection station at the entrance and exit of the disposal site is critical in verifying the contractor's loads and to ensure that the load has been fully dumped
- When using weight (ton) measurements, certified scales must be used
 - o Scales must be certified by person licensed by the State
- A systematic method of recording load and measurement data must be in place. Load tickets are normally used as the basis for verifying quantities.

Lump Sum




A lump sum contract establishes a fixed contract price by a one-item bid from the contractor.

- The lump sum contract should be used only when the scope of work is clearly defined by the community (not the contractor), including quantity, type and location of debris.
 - o This information will be used to judge the reasonableness of the cost for reimbursement.
 - o Change orders must clearly state the reason for the change; why the debris was not considered in the original contract, the exact quantity, mix and location, etc.


- It is understood in a lump sum contract that the price for the work is fixed unless the scope of work changes; therefore, the bottom line of the contract is not in question, as it is with the unit price contract.
 - There are two methods of measurement:
 - o Area method
 - o Pass method
-

Area Method



Lump Sum - Area Contract

<u>Advantages</u>	<u>Disadvantages</u>
<ul style="list-style-type: none">• Minimum management needed• Contractor assumes most of the risk• Price is based on estimated quantity	<ul style="list-style-type: none">• Needs very clear, definite scope of work• Can be difficult to estimate amount of debris• High probability of claims

California Emergency Management AgencyDisaster Debris Management

The area method of a lump sum contract is used when a defined area is provided. For example, once all the debris within a well-defined area has been placed at the curbside, a scope of work can be written that requires the contractor to conduct a one-time pass to be removed all identified material from the curbside and placed at a specified location (landfill).




Area Method Advantages:

- Provides an easy means of establishing the cost of the work at the time of bid opening
- Requires minimum labor for monitoring
- Is easy to monitor as the scope of work is well defined
- Is easy to determine when the contractor has completed the work
- The contractor assumes most of the risk

Area Method Disadvantages:

- Scope of work must be definable to minimize change orders for additional work
- May result in difficulty to quantify the amount of debris that will be brought to the right-of-way for removal
- Has a high probability of claims if debris estimates are difficult to estimate and require speculation

Pass Method

 Lump Sum - Pass Contract	
Advantages	Disadvantages
<ul style="list-style-type: none">• Minimum management needed• Scope of work is more defined• Quantities do not need to be documented unless change order submitted 	<ul style="list-style-type: none">• Requires accurate, up-to-date plans• Public must cooperate• Public information officer needed 
<small>California Emergency Management Agency</small>	<small>Disaster Debris Management</small>

The pass method is used when the scope defines how many passes down a particular street or in a given section of the town will be completed. For example, if homeowners are provided a schedule for placing certain materials at curbside over a specific period of time (say three week duration), a scope of work can be prepared to require the contractor to conduct a minimum number of passes (say three) throughout the community during the three-week period (say one pass per week) and place the material at a specified location (landfill).

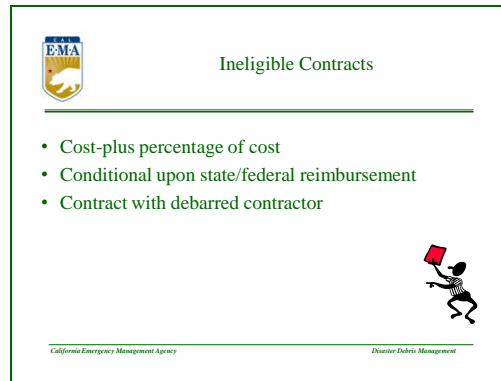
Pass Method Advantages:

- o Minimum labor required for monitoring and management
- o Defines the scope of work better than Area Method and decreases the risk of claims caused by quantity speculation
- o Quantities do not need to be documented as they do in a unit price contract

Pass Method Disadvantages:

- o Must have accurate, up-to-date plans and information on all roads that will be included in the “pass” scope of work
- o Public must cooperate in the removal process – placing debris on a schedule, segregating materials, placing only eligible debris
- o Contracting agency must be successful in communicating with the public in removal area

Ineligible Contracts



The following conditions may result in terms of contracts, and associated work, being ineligible for Federal reimbursement.

- Cost-plus percentage of cost
 - o 44 CFR Part 13.36(f)(4) specifically precludes use of this contract type
 - o This type of contract encourages the contractor to exceed the initial cost estimates by basing their fee on a percentage of the costs
- Conditional upon state/federal reimbursement
 - o Contracts which indicate a contractor will be paid only upon receiving state/federal funds are ineligible
- Contracts with debarred contractors
 - o 44 CFR Part 13.35 specifically precludes use of debarred contractors
 - o Communities should check with the State for current list of debarred contractors

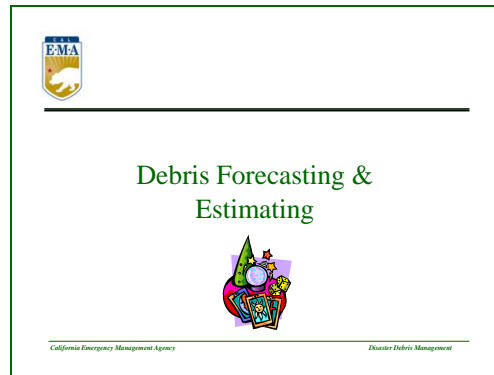
Information regarding contractors can be found on the California Contractor's State Licensing Board at: www.cslb.ca.gov/consumers/default.asp or on the FEMA website at: www.arnet.gov/epls/.

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Debris Forecasting and Estimating

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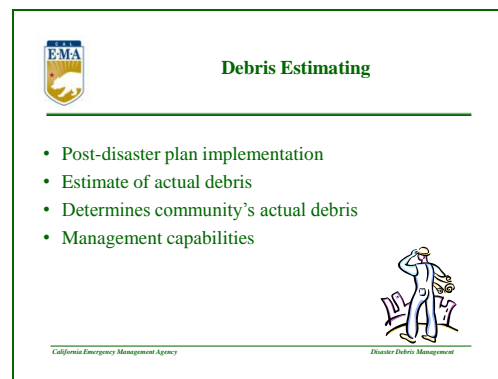
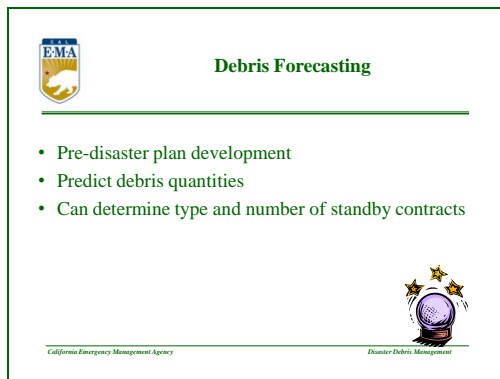
Introduction



The purpose of this section is to present various debris forecasting and estimating techniques including various tools and rules of thumb to assist the Debris Manager in planning for large scale debris operations.

The determination of the quantity and type of debris is critical to debris management. Debris contracting, the management of Debris Management Sites and the possible need for State and Federal Resources (covered in following units) will require a reasonably accurate estimate of debris quantities.

Introduction – Cont'd



Forecasting

Debris forecasting is normally a pre-disaster technique used to predict debris quantities.

Certain planning assumptions must be made concerning the type and magnitude of debris generating events.

For instance, the plan would assume that a specific type of event, such as a major earthquake in a heavily populated area, would affect the area with large quantities of primarily construction and demolition debris.

Or, the plan may assume a range of debris generating events from small floods and tornados to catastrophic similar events.

Debris Forecasting can also be used to determine the type and number of stand-by contracts required to remove and dispose of the predicted debris.

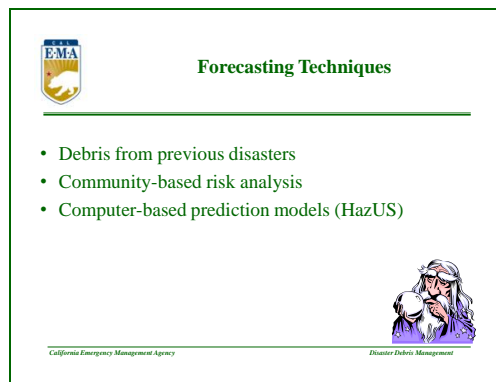
Estimating

Debris estimating is normally used in a post-disaster situation to establish a reasonable estimate of the actual debris quantities and mix.

Debris estimates will be used to determine a community's actual capability to handle the situation.

Debris estimates will be used to determine the actual need for Debris Management Sites, contracts and landfill space requirements.

Debris Forecasting Techniques




There are three basic techniques that are used for debris forecasting:

- An analysis of prior debris generating events can be conducted for your community or a similar community. With this analysis completed it may be possible to plan for effective response to similar type events. However, because the event may have been limited in scope or experienced debris staff is no longer available, this method has severe limitations.
- More commonly, a community-based risk analysis is completed to determine the types and quantities of debris generated by various events. This analysis is then used as a critical component of the debris management plan.
- Computers can be used for both of the first two techniques to perform calculations and present the analysis. However, there are a range of computer-based prediction models available to perform some of the more routine calculations, use a community's Geographical Information System (GIS) and plan for any number of event scenarios.


When these three techniques are combined a very effective analysis can be completed.

Debris Forecasting Techniques – Cont'd



Forecasting Techniques Historical Analysis

- Analyze past events
- Interview staff
- Review changes in conditions
 - Land use
 - Landfill capacity
 - Community response capability
 - Law & regulations



California Emergency Management Agency Disaster Debris Management


In order to complete an historical analysis of prior debris events, some basic information should be gathered:

- Prior event(s) should be selected from your community or from communities who have experienced the type of disaster you have forecasted for your community.
- Key staff members responsible for debris activities should be interviewed to determine procedures that were effective and those that were not.

An analysis of any effect in changes to the way your community would be able to respond to such events as:


- Land use changes that may increase or decrease the types of debris generated.
- A significant decrease in your landfill capacity or more current landfill regulations may have a very severe impact.
- An increase or decrease in your community's engineering or solid waste department staff could also make a difference in your response capability.

Debris Forecasting Techniques (Cont'd)



Forecasting Techniques Community-Based Risk Analysis

- Get detailed maps of land use
- Create sample of debris quantities
- Project debris quantity estimate
- Interactive models
 - USACE
 - Private Industry
 - HazUS (FEMA)
 - HAZARD-Tech (NOAA)



California Emergency Management Agency Disaster Debris Management

A simple method can be used to systematically forecast the type and quantity of debris for a community.

- First, obtain detailed maps of your community and highlight them with an indication of the type of land use in each area, such as urban, industrial, rural and mixed. This area separation will make your analysis as similar land use areas can be assumed to have similar debris types.
 - o For instance: parks, orchards, groves, nurseries and tree-lined streets will have similar debris quantities based on an acreage or mileage basis.
 - o Commercial and Industrial areas tend to have heavy amounts of construction and demolition type debris.
 - o Residential areas can be a combination of vegetative , construction and demolition debris.
- Second, develop a representative sample of the debris in each area.
 - o Debris quantities can be estimated using the guidelines provided:
 - ♦ One story house = Volume in cubic yards times 0.33
 - ♦ Personal property from flooded home without basement = 25-30 cy
 - ♦ Single wide mobile home = 290 cy
 - ♦ Double wide mobile home = 415 cy
 - o The terms light, medium and heavy are somewhat subjective, but the general guide is: If there is very light vegetation covering the house, yard or driveway, it's light. If there is a canopy of trees covering the house, it's heavy. Use medium for everything else.
- Third, project the sampling of debris for each area and provide a total of the amount and type of debris for each area. The grand total of all these calculations will provide you with an estimate useful for planning purposes.

Please understand that this type of debris forecasting is not an exact science. Broad assumptions and wide-scale projections must be made throughout the process. However, even with its inaccuracies, the resulting quantity estimate can be very useful in completing the next phases of the planning process, such as selecting Debris Management Sites or developing contracts.

Computerized modeling programs have been developed to provide reasonable debris predictions for communities under various disaster types. Types of these interactive models are:

USACE – Can provide debris plans from past disasters, as well as, technical assistance.

Private Industry - Consultants are available.

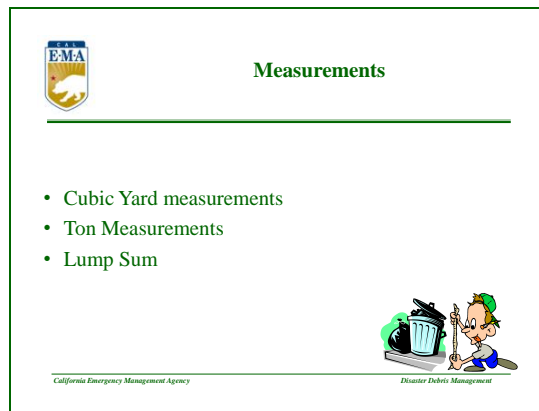
HAZUS (FEMA) - The **Hazards U.S. Multi-Hazard (Hazus-MH)** is a nationally applicable standardized methodology that estimates potential losses from earthquakes, hurricane winds, and floods.

Hazus-MH uses state-of-the-art Geographic Information Systems (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of earthquakes, hurricane winds, and floods on populations.

HAZARD-Tech (NOAA) - HAZARD-Tech is a free, public resource for hazard-oriented professionals, including mitigation planners, emergency managers, hazard scientists and engineers, geospatial technologists, and others.

The purpose of this Site is to provide an interactive environment that fosters learning and communicating. There is particular focus on exposing the technologies (tools) that support hazard management disciplines, and providing information in support of those tools.

Measurements



Measurements can be done in many ways. In most cases, measurements are made by volume (cubic yards). However, if material is being taken to a landfill, there may be access to a scale for weight measurements. For demolition, contractors may use a lump sum price.

It is very important to record the process and basis for the estimate on the PWs (for public assistance funding) and other reports.

Cubic Yard: Cubic Yard (cy) measurements are often used to determine the unit price of debris (woody, mixed or construction & demolition) transported to a Debris Management Site or permanent landfill.

- All trucks being used to transport debris must be measured and the resulting quantity in cubic yards recorded on the side of the truck and recorded on all load tickets
- Trucks with less than full capacities will be adjusted down by visual inspection by the Field Debris Monitor who will verify the quantity and type of debris contained in the bed of the truck from an inspection tower
- Load tickets are often used to document measurements.

Ton Measurements: All trucks must have a certified tare weight (empty) established if payments are going to be made based on certified scale net weight receipts. Field Debris Monitors will be required to spot check trucks after dumping to see if they are still at their tare weight.

Note: Gross weight – tare weight = net weight.

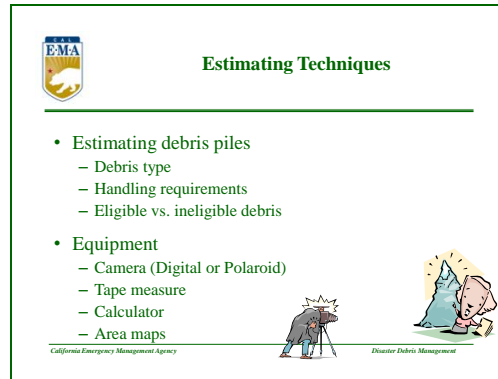
Conversions

The following are rules of thumb. It will be necessary to do a field test to verify the makeup of the debris for your area and disaster type.

- Actual numbers can be very different. Taking an average load, measuring the truck, then weighing it will help determine what to use for a specific situation.
- When developing cubic yard (cy) measurements, divide cubic feet by 27.
- When converting from cy to tons, remember to use the correct factor:
- Use 2 if converting for construction & demolition material
- Use 4 if converting for woody material

- Rules of thumb:
 - o 15 trees 8 inches in diameter = 40 cy (average)
 - o Root system (8'-10' diameter) = may require one flat bed trailer to move
 - o To convert cy of C&D debris to tons, divide by 2
 - o To convert tons of C&D debris to cy, multiply by 2
-

Debris Estimating Techniques



There are many different ways to estimate debris. Being creative with the tools, techniques and information available to you can bring the best results. The following slides present various techniques and ways of using them alone and in combination with other techniques to provide the desired product.

Estimating Debris Piles

There are many things to consider when estimating debris:

- First consideration: type of debris, for example:
 - o vegetative
 - o construction and demolition
 - o mobile homes
 - o a mix of different things
- Identify handling requirements, for example, if you will need to separate it.
- For PA funding, determine if the debris is eligible or what portion is eligible.

It is important to have the correct tools, aids and information in place when doing estimates. Debris estimates are only as good as the basic information used to create them.

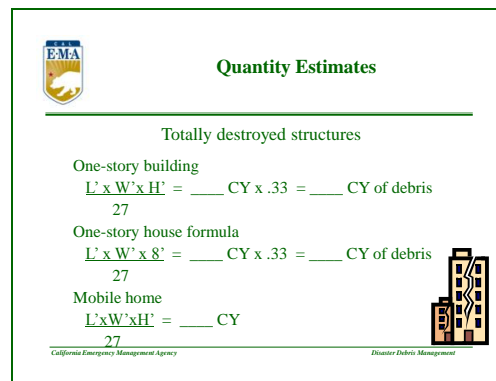
- Ensure that necessary equipment is available, including:
 - o Digital (preferred) or Polaroid camera
 - o 100-foot tape or roll-off wheel
 - o Calculator, notepad, sketchpad
 - o Maps of area
 - o Aerial photographs (preferably before and after the disaster)
 - o Dedicated vehicle and mobile communications

Once the equipment is in place, consider the area to be estimated and the manner in which the area should be divided (sectors). Debris estimating can be expedited by dividing the community into sectors based on any of the following:

- Type of debris: woody, mixed or construction material
- Location of debris: residential, commercial, or industrial
- Land use: rural or urban

Remember that however you define your area, you must be consistent with your system and keep detailed notes on how, where and what method you used for your estimates. These notes must be well documented and maintained for future reference. For Presidentially declared disasters, the information will be incorporated on the Project Worksheet.

Debris Estimating Techniques (Cont'd)



Estimating Aids – Buildings: The following information will assist you in determining the amount of debris from destroyed buildings, homes and debris piles:

- One-story building formula:
 $\frac{L' \times W' \times H'}{27} = \text{___ CY} \times .33 = \text{___ CY}$
- One-story house formula:
 $\frac{L' \times W' \times 8'}{27 \text{ per cy}} = \text{___ cubic yards} \times 0.33 = \text{___ cubic yards of debris}$
(The 0.33 factor accounts for the “air space” in the house)
- Outbuildings
 $\frac{L' \times W' \times H' \times .033}{27 \text{ per cy}} = \text{___ cubic yards of debris}$
- Mobile homes formula:
 $\frac{L' \times W' \times H'}{27 \text{ per cy}} = \text{CY}$
Length = L, Width = W, and Height = H. All measurements are in “feet”.

Note: The 0.33 factor is not applied to mobile home calculations due to their compact construction. The 27 factor is the conversion factor from cubic feet to cubic yards.


Typical quantities for mobile homes:

- Single wide mobile home = 290 cy of debris
- Double wide mobile home = 415 cy of debris


Participants typically have a difficult time accepting these numbers because they are larger than the standard stick-built homes. This has to do with the wasted air space in the average stick-built home. In mobile homes there is very little wasted air space – every inch of the unit is used in storage; the walls are narrower, etc.

These numbers were verified during Hurricane Floyd. The State of North Carolina demolished approximately 2,000 mobile homes following that flood.


Quantity Estimates – Cont'd




Quantity Estimates



Debris piles
 $\frac{L' \times W' \times H'}{27} = \text{CY}$




Football field
10ft high = 17,778 CY



Flood debris (household goods)
Without basement = 25 – 30 CY
With basement = 45 – 50 CY

Building demolition
Area of building footprint x building height/3 = volume



California Emergency Management AgencyDisaster Debris Management

Debris piles:

$$\frac{L' \times W' \times H'}{27} = \text{CY}$$

Length = L, Width = W, and Height = H. All measurements are in “feet”.

Reminders: The following reminders may be of assistance when performing debris estimates:

- Look beyond the curb into side and backyards and at condition of the homes. Most debris in these areas will eventually move to the curb
- Wet storms will produce more personal property debris (household furnishings, clothing, rugs, etc.) if roofs are blown away
- Look for hanging debris such as broken limbs after an ice storm
- Flood-deposited sediment may be compacted in place. Volume may increase as debris is picked up and moved.
- Using aerial photographs in combination with ground measurements will help determine if there are any voids in the middle of large debris piles
- Treat debris pile as a cube, not a cone, when performing estimates

Scattered Debris Quantities

The quantity of scattered debris is difficult to estimate, and may involve a wide area. If the area can be clearly identified, then the following two methods may be helpful.

Average depth method - used to estimate concentrated debris fields.

- Calculate the area covered by the debris
- Make a rough estimate of the average depth of the debris.
- Multiply the average depth times the area to arrive at the volume.

Raked debris method – see steps below.

- Measure out an area of average debris quantity, such as ten yards by ten yards, or 100 sy.
- Rake or sweep together the scattered debris within that area into a cone-shaped debris pile.
- Estimate the raked debris volume using the cone volume method.
- Divide the debris volume by the measured area to get a volume per square yard.
- Multiply the result of Line 4 by the total area with scattered debris to estimate the total debris volume.

Building Demolition Quantities

After a disaster, building may not have totally collapsed, but may be slated for demolition due to being a threat to public safety. Estimating the amount of debris that will need to be hauled away can be done by using the following formula:

- $\text{Area of building footprint} \times \text{building height} / 3 = \text{volume}$

In cases where a building changes its footprint or size at higher floors, the volume can be calculated by estimating the different footprint floors separately and adding the volumes together. There is some flexibility built into this calculation in the result to allow for the uneven shapes of the resulting debris.

Example: A 1930s-era high-rise was severely damaged and must be demolished. It has three footprints stacked on one another, one at 45,000 sf, 30,000 sf, and 18,000 sf, respectively. The lower two sections are five stories at 12 ft high per floor, and the upper section is three stories at 10 ft high per floor.

Calculate the debris volume in cubic yards.

Height of the sections: 5 stories x 12 ft/story = 60 ft.

3 stories x 10 ft/story = 30 ft.

$[(45,000 \text{ sf} \times 60 \text{ ft}) + (30,000 \text{ sf} \times 60 \text{ ft}) + (18,000 \text{ sf} \times 30 \text{ ft})] / 3 = 1,680,000 \text{ cf.}$

$1,680,000 \text{ cf} / 27 \text{ cf/cy} = 62,222 \text{ cy (rounded).}$

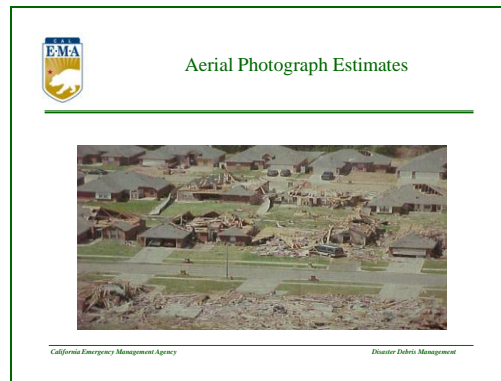
Explosions

Debris fields from explosions are varied as the explosions themselves.

If the explosion resulted in a collapsed building or buildings, use the methods described in Building Demolition Quantities.

If this doesn't work, one of the other debris quantity estimating methods may result in a useful solution, including the scattered debris quantity methods.

Debris Estimating Techniques -Cont'd



Damage estimates can be made from available aerial photographs. A local newspaper supplied the above photograph.

To estimate debris using a photograph such as this:

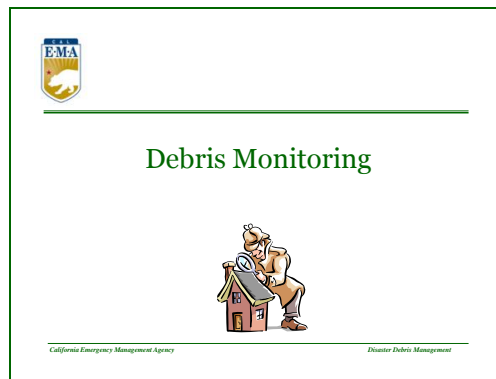
- Select an object in the photograph for which the length can be reasonably estimated, such as the truck.
- Measure the truck in the foreground and estimate its length at 25 feet.
- Apply that length to the intact houses to estimate the approximate length and width of each house. Calculate the approximate square footage by multiplying the length times the width. If you have houses of differing sizes, measure several and then calculate an average square footage.

Note: After the Oklahoma City tornado, photos from a news report and aerial photographs were used to do debris estimation. It can be very accurate in the right situation.

Debris Monitoring

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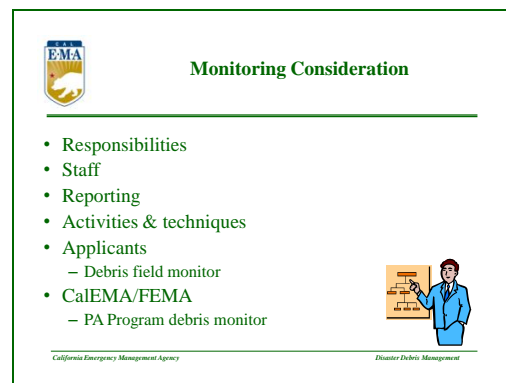
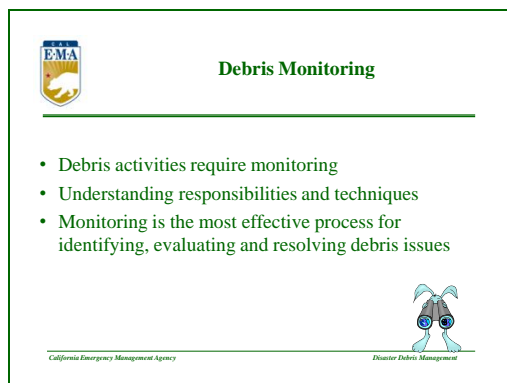
Introduction



Debris activities require monitoring by trained and supervised personnel.

- Effective debris management planning requires a thorough understanding of debris monitoring responsibilities and techniques
 - Most importantly, debris monitoring is the most effective process for identifying, evaluating, and resolving debris issues
-

Debris Monitoring Considerations



Inadequate monitoring of debris activities often results in disputes between an applicant and the contractor, and/or the applicant and FEMA over Federal reimbursement for debris removal, reduction and disposal, and often loss of funding.

There are a number of monitoring considerations that are critical to effective monitoring of debris activities. These include:

- Responsibilities
- Staff to perform tasks
- Documentation and reporting requirements
- Monitoring activities and techniques

- It is important to recognize that the monitoring process is used to both identify and resolve debris-related issues
- It is the primary responsibility of the applicant to independently monitor all debris activities, whether performed by their own force account labor or contract
 - For the purpose of this discussion, the applicant's monitoring staff is referred to as the Debris Field Monitor
 - The Debris Field Monitor is responsible for monitoring of the specific day-to-day field activities
- In Presidentially declared events, FEMA will perform overall monitoring of an applicant's debris activities. This does not relieve applicants of any of their own monitoring responsibilities.
 - For the purpose of this discussion, FEMA's monitoring staff is referred to as the Public Assistance (PA) Program Debris Monitor

Debris Field Monitor – Applicant Responsibility

The applicant's Debris Field Monitor typically will:

- Be assigned to a specific task and be on site every day.
- Monitor specific activities at loading sites, debris management site inspection sites or landfills.
- Prepare a quantitative report of activities completed.
- Most importantly, identify and resolve debris issues.

For State/Presidentially declared disasters, it is the applicant's responsibility to provide sufficient documentation to support that:

- The scope of the work performed meets eligibility criteria.
- Often, a contractor or the applicant's own forces may perform activities that are not eligible for federal reimbursement while completing other eligible activities. Such work must be clearly identified, documented and quantified to minimize disputes when the work is completed.
- The quantities (cubic yards of debris, hours of operation, etc.) are adequately verified. The information provided by the applicant's field monitor usually provides the basis of this documentation.

Program Debris Monitor – State/ FEMA Responsibility

Cal EMA/FEMA has the authority to monitor an applicant's debris operations, whether they be performed by an applicant's force account or contract. Often, a two-person, FEMA/State team will perform this function. Generally, the Program Debris Monitor will be staffed by:

- Debris Specialists – generally the most qualified for this role but may need additional support depending on the severity of the operations and number of Specialists deployed to the disaster
- Technical Assistance Contractors – often have this expertise
- Other State and/or Federal agencies, such as Caltrans or USACE

Typically these staff will:

- Make periodic site visits, depending on the magnitude and complexity of an applicant's operations.
- Assess operations compliance with the terms of the *Project Worksheets*, the contract, and the applicant's debris monitoring plan.
- Review field notes and/or reports prepared by the Debris Field Monitors.
- Compile payment and cost documentation for an applicant's operations.
- Prepare a summary report of observations, issues and resolutions.

- Provide training to Debris Field Monitors.
-

Monitoring Staff



The applicant should use full-time debris monitors to account for all debris management activities.

- The applicant should never rely solely on the records or invoices provided by the contractor
- These monitors should be trained and properly supervised
 - o Cal EMA/ FEMA may provide training on State and/or Presidentially declared disasters, if necessary
- The size of the staff will depend on the operation, and may range from a few individuals who randomly monitor pickup and disposal sites (least efficient) to having a monitor at every pickup and disposal site (most efficient, most costly).
- Staffing may be provided by:
 - o Local force account labor or temporary hires. Retired employees can be a good resource.
 - ♦ Overtime or straight time eligible for their staff to meet FEMA's eligibility criteria in Presidentially declared disasters is for a:
 - permanent employee
 - temporary employee
 - seasonal employees
 - ♦ Indicate that because of the regular time restrictions, many applicants choose to use contractors to perform monitoring activities for declared events.
- Engineering firms usually have staff with construction experience that could provide the monitoring functions (these do not need to be professional engineers). The debris contractor, but rather an independent engineering firm should not employ this staff.

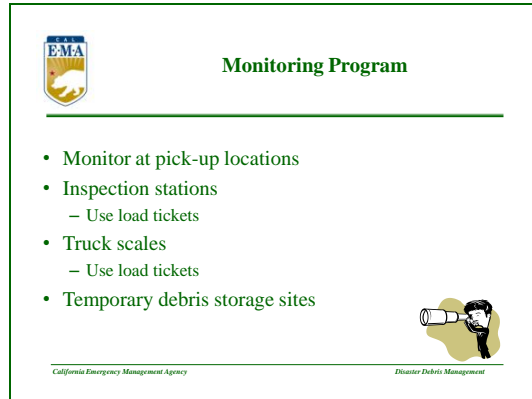
Debris Monitoring Report



It is important to develop a monitoring system that includes a systematic method of identifying pertinent activities and recording relevant observations and data.

- A monitoring report should be developed to capture specific debris-related activities, based on the method of payment (force account or contract type) and other issues unique to the applicant's operations
 - The reports may also be used to assess eligibility of debris-related activities and quantities
-

Monitoring Program




A monitoring program observes and documents the work being done at two locations, minimum – point of collection and disposal (temporary and final). Some items to document at the various monitoring points include:

- Debris Loading Area
 - o Eligible debris is being picked up from contract area
 - o If debris types are separated at the curbside, check that the contractor keeps it separated
 - o Truck loads are full
 - o Tailgates are in-place
 - o If sideboards are in place
 - o Time of pickup

- o Load is reasonably compact – large obstructions are not restricting placement of material. Note that if the loads are not properly loaded on compacted, debris monitors should reduce the rated volume of the truck accordingly
 - Debris Unloading Area
 - o Truck size is as reported on the load ticket
 - o Determine proper debris quantities
 - o Check time of collection for reasonable turnaround
 - o Assure appropriate materials are properly segregated, such as HHW
 - Debris Management Site
 - o Record inactive times of contract equipment
 - o If air curtain incinerators are used, assure proper procedures
 - o Assure HHW is properly segregated
 - o Assure safety of personnel around equipment
 - o At a minimum, an elevated inspection station should be used to enable the monitor to look down into the truck to verify both the contents and the load amount.
 - o Monitoring should also be performed at the exit point of the Debris Management Site to ensure the load has been sufficiently dumped.
 - If the contract is by weight, then there should be a monitor at the certified scales
 - One of the best methods of monitoring is to use a load ticket system as discussed on the next slide
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Debris Monitoring Observations



Monitoring Program – Cont'd

Debris Monitors should:

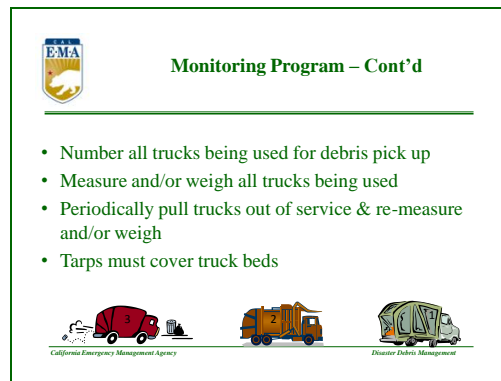
- Have a good understanding of eligible debris
- Understand any limits imposed on specific types of debris
- Observe operations to ensure ineligible debris is not picked up
- Watch for and stop illegal dumpsites

California Emergency Management AgencyDisaster Debris Management

Debris activities require monitoring. Listed below are items to be aware of:

- Monitors should observe operations to ensure ineligible debris is not picked up.
- Monitors should have a good understanding of eligible debris (especially from private property) and any time limits imposed on pickup of specific types of debris. Examples (from actual occurrences) include sweeping areas for abandoned cars and white goods, cleaning up illegal dumpsites, removing cut trees from subdivisions under development, and removing/cutting trees from the right-of-way in rural areas.

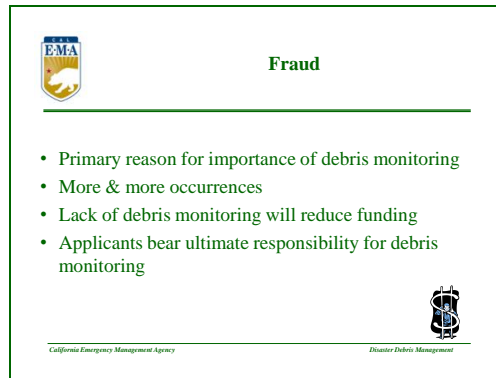
Debris Monitoring Observations – Cont'd



Prior to use, all trucks should be numbered, measured and load capacities (cubic yard or weight capacities) documented by truck number. Periodically, trucks should be pulled out of operation and re-measured.

- It is important to ensure that tare weights (empty) have been taken for each truck
- Remember that gross weight minus the tare weight equals the net weight. In this situation, the scale house operator was estimating the weight because the scale was broken. If this happens, then the quantity of material should be measured in cubic yards and converted to tons.
- California requires trucks to have tarps that cover the bed. If a monitor sees a truck without a tarp, he or she may want to take note of the truck number and report it to their supervisor. Remember that monitors are not law enforcement officers. Tickets received by the truck drivers for this are not reimbursable.
- Debris Management Sites should have only one way in and one way out or have an inspection station at the exit. Trucks have been reported driving through the disposal site without unloading, then re-entering with the same load.
 - o This can be detected by observing the time of departure and time of arrival recorded on the driver's load ticket
 - o This may also indicate problems with the community's debris monitors at the loading or unloading site.

Debris Management Fraud



Fraud is the primary reason that debris management has come to the forefront and under such severe scrutiny. During several disasters, glaring incidents of fraud have occurred that have given rise to the importance placed on debris monitoring.

One instance is that after a major hurricane struck Guam; various officials from FEMA and Guam were flying over the area observing the damage and recovery operations. While flying over several mounds of debris it was noticed that the piles were not piles but donuts. The centers were empty, but the piles were being measured (cubic yards) as if they were whole.

During debris removal operations for the World Trade Center, the following occurred:

- FEMA installed GPS tracking devices that were removed from trucks
- Debris was picked up from non-disaster related sites

Other incidents of fraud have included:

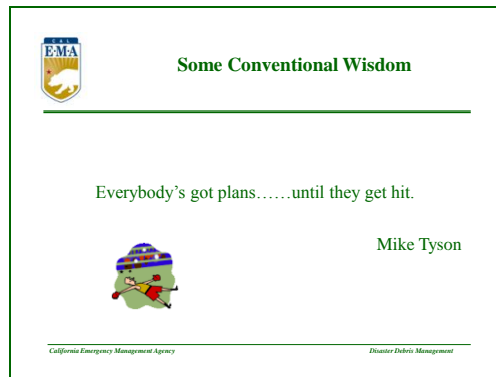
- Occasions when contractors have added excessive water to debris loads to increase the weight when being paid by the ton. This can be detected during monitoring before the load reaches the disposal site by observing excessive water dripping from the truck bed, or by inspecting the truck bed immediately after unloading.
- Contractors have been known to weld heavy grating to trucks after being measured. This is another reason to pull trucks and re-measure them.

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DEBRIS MANAGEMENT PLAN

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Introduction

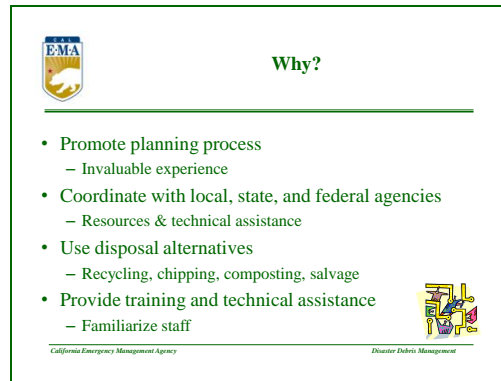


This quote is an accurate statement especially for disasters. Everyone thinks they know or will know how to handle anything that is thrown their way. Sadly, as seen by the devastation from Hurricane Katrina, it's not always true. Plans themselves do not always work the way they are intended to, especially if you can't control all the elements involved. A proper planning process requires consideration of all possible elements and is of itself, priceless.

After years of fires, earthquakes and civil unrest, resulting in tons of debris, emergency management realized the need for a systems approach to debris management. This approach emphasizes the interdependency and connectivity of all aspects of debris management. The incorporation of debris management into local emergency planning activities is an essential element of disaster preparedness and cost-effective response and recovery operations.

The information presented is intended to assist in the development of a coordinated, statewide strategy for the management of disaster-related debris generated in California. This document also provides guidance to local jurisdictions regarding disaster debris management including planning tools, standard operating procedures, and disaster relief grant eligibility criteria. Assistance with more rapid issue resolution and informational resources are also provided.

Another Plan?!



To maximize resources while minimizing the debris load to landfills following a disaster, local government is encouraged to incorporate debris management in their emergency and solid waste management planning activities. As part of the planning process, local government should identify any special considerations in their area of authority, potential disaster types, event characteristics and the debris anticipated as a result. Local emergency plans should be coordinated with solid waste planning to include debris management strategies, reuse and recycling opportunities, quantity estimations, landfill capacities, landfill class/type and potential temporary storage sites.

Successful debris planning efforts will result in more efficient use of limited resources, timely access to critical infrastructure and environmentally safe solutions to debris issues.


Local preparedness will assist the State in diverting significant amounts of recyclable materials that would otherwise be disposed of as debris and thus preserving the State's landfill capacity.

It is also essential that debris management planning activities become an integral part of other emergency planning activities within the jurisdiction. Local government should also participate in neighboring emergency planning activities, regional emergency planning activities and mutual aid planning to ensure the appropriate risks are factored into the planning process. Toward this end, Cal EMA may provide technical assistance as appropriate to local government and facilitate the integration of state and federal requirements into these planning efforts.

The core components of the state disaster debris management strategy include:


- Promoting planning
- Coordinating federal, state, and local agencies and private companies
- Standardizing operational procedures
- Utilizing disposal alternatives
 - o Optimizing the use of limited resources
 - o Utilizing environmentally sound management approaches
 - o Applying economic criteria to alternative considerations
- Providing training and technical assistance regarding regulations, guidelines and policies.

Considerations



Plan Considerations

- Disaster Types
 - Amount & types of debris generated
- Roles & Responsibilities
 - Who's doing what
- Local Community
 - Vulnerabilities
 - Local landfills
- Resources
 - In-house, regional, state & federal capabilities




California Emergency Management Agency Disaster Debris Management

The main considerations of the plan should take into account:

- The type(s) of disaster(s) that potentially might occur, or have occurred, in your community.
- The magnitude of a disaster will require varying levels of resources – therefore, must consider:
 - Supplemental assistance available from local, State or Federal programs and resources
 - In-house capability to respond to varying magnitudes
 - Types of supplemental assistance that are available from mutual-aid agreements, the State Department of Transportation, or other external resources
 - The size and number of contracts that may be required
- Determine how to handle unforeseen contingencies.

Note: Go to the My Hazards website to see the potential events that could occur in your area (<http://myhazards.calema.ca.gov/>). This site can also show you how to reduce your risk. Remember the best way to recover from a disaster is to minimize the risks before the disaster happens.


Plan Outline




Plan Outline

I. Staff Roles and Responsibilities

- Staffing Organizational Chart
- Roles and Responsibilities
- Staffing Assignments and Duties
- Administration
- Contracting and Procurement
- Legal
- Operations
- Engineering
 - Emergency Communications Plan
 - Health and Safety Plan and Procedures
 - Training schedule




California Emergency Management Agency Disaster Debris Management



Plan Outline

II. Situation and Assumptions

- Design Disaster Event
- Forecasted debris
 - Forecasted Types
 - Forecasted Locations




California Emergency Management Agency Disaster Debris Management

Here is an example of a debris plan outline currently being favored by FEMA. Debris plans should incorporate and/or address the following elements:

- I. Staff Roles and Responsibilities
 - o Staffing Organizational Chart
 - o Roles and Responsibilities
 - o Emergency Communications Plan
 - o Health and Safety Plan and Procedures
 - o Training schedule
 - II. Situation and Assumptions
 - o Design Disaster Event
 - o Forecasted debris
 - o Forecasted Locations
-


Plan Outline – Cont'd



Plan Outline

III. Debris Collection Plan

- Priorities
- Response Operations
- Recovery Operations
 - Estimating staff, procedures and assignments
 - Collection Method
 - Curbside Collection
 - Collection Centers
 - Collecting Hazardous Waste and White Goods
 - Monitoring Staff and Assignments



California Emergency Management AgencyDisaster Debris Management



Plan Outline

IV. Debris Management Sites

- Site Management
- Site Manager
- Monitoring Staff and Assignments
- Safety Personnel
- Establishment and Operations Planning
- Permits
- Locations
 - Ingress/egress for sites

IV. Debris Management Sites


- Site Layouts
- Site Preparation
- Site Layout
- Volume Reduction Methods
- Recycling
- Environmental Monitoring Program
- Site Closure



California Emergency Management AgencyDisaster Debris Management

- III. Debris Collection Plan
 - o Priorities
 - o Response Operations
 - o Recovery Operations
- IV. Debris Management Sites
 - o Site Management
 - o Establishment and Operations Planning


Plan Outline – Cont'd




Plan Outline

V. Contracted Services

- Emergency Contracting/Procurement Procedures
- Debris operations to be outsourced
- General Contract Provisions
- Qualification Requirements
- Solicitation of Contractors





California Emergency Management Agency Disaster Debris Management



Plan Outline

VI. Private Property Demolition and Debris Removal


- Condemnation criteria and procedures
 - Legal documentation
 - Demolition permitting
 - Inspections
- Mobile home park procedures
- Navigation hazard removal procedures



California Emergency Management Agency Disaster Debris Management

- V. Contracted Services
 - o Emergency Contracting/Procurement Procedures
 - o Debris operations to be outsourced
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 - o Qualification Requirements
 - o Solicitation of Contractors
 - VI. Private Property Demolition and Debris Removal
 - o Condemnation criteria and procedures
 - o Mobile home park procedures
 - o Navigation hazard removal procedures
-


Plan Outline – Cont'd



Plan Outline

VII. Public Information Plan

- Public Information Officer
- Pre-scripted information
- Distribution plan



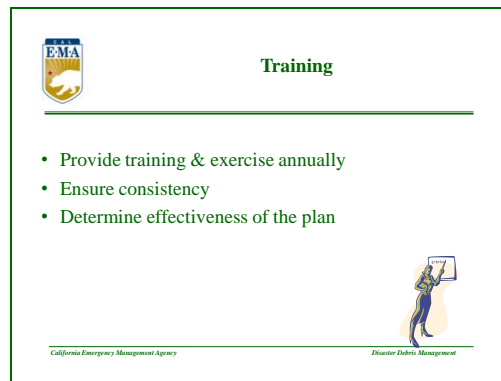
California Emergency Management Agency Disaster Debris Management

Don't forget to include your public information office in your debris workforce and plan. They can provide valuable assistance to get the word out about proposed debris operations in the disaster area. They can help you send the message you want to those affected by the disaster.

- VII. Public Information Plan
 - o Public Information Officer
 - o Pre-scripted information

- o Distribution plan

Training



In order to ensure statewide consistency and adequacy of debris management operations, local, state and federal agencies should provide periodic training of the debris management plan to all potential participants in the debris management plan, including private companies franchised or contracted to provide service during a disaster. In addition, exercises should be developed to determine the efficiency and effectiveness of operational procedures. State agency resources are available to facilitate these training and exercise activities as well as technical assistance with debris management issues.

In addition, Cal EMA can provide training regarding disaster debris planning, state and federal grant eligibility and reasonable costs of debris management activities, disaster debris contracting issues and requirements, and estimating disaster debris volumes.

Summary



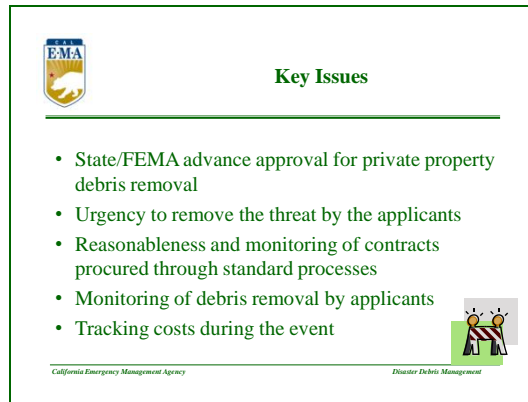
The Debris Management Plan is a living document. Once written, the following actions must be taken:

- The plan must be approved by the implementing agencies and departments, and adopted according to city/county requirements
- The community must ensure there are procedures for providing training
- The plan must be exercised to ensure it works
- The plan should be dynamic, reviewed and updated on an established, periodic basis

Lessons Learned

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Key Issues



Some important issues to be aware of are those found during reviews and audits made during and after previous disasters.


- Improper Contracts
 - Contracts were awarded without following appropriate bidding procedures.
 - Contracts were not properly reviewed before signing.
 - Costs per ton or cubic yard were excessive.
 - Contracts were not properly monitored or managed.
- There was no organized response to debris activities – no one was responsible for coordinating the effort.
- There was either no documented estimate of debris, or it was incomplete.
- Non-disaster debris was moved and charged to the disaster.
- Overall documentation was incomplete or insufficient.
- There was failure to comply with environmental or historic preservation legal requirements.
- Failure to get approval from Cal EMA and/or FEMA **before** beginning private property debris removal operations.

Private Property Debris Removal



Private Property Debris Removal Issues

- Removal of ineligible debris
- Right-of-Entry (ROE) form
- Insurance
 - Applicant responsible for collection
- Trees
 - Must be a threat to public safety
- Chimneys
 - Must be threat to public safety
- Commercial Sites
 - Must be a threat to public health & safety




California Emergency Management AgencyDisaster Debris Management

Private property debris removal does have a few key points to keep in mind:


- Remember, an applicant **must** have prior approval from the State and/or FEMA before beginning this process.
- Private property debris removal is an action that gives communities a sense of hope and rebirth. However, you must remember that there are costs associated with this process and a significant investment of your time to ensure a successful outcome.
- Demonstrate the threat
- Ineligible debris
- Right-of-Entry (ROE) form
- Monitoring
- Insurance Recovery
 - Conventional coverage for debris removal
- Trees
- Chimneys
- Timely removal of debris
- Commercial sites
 - Debris must be an immediate threat to public health & safety.

Monitoring



Monitoring

- Applicant must monitor debris removal operations.
 - Ultimate responsibility is the applicant's, not the contractor
 - Pay attention, it's your money



California Emergency Management Agency Disaster Debris Management

Monitoring is an important way to resolve issues and/or prevent problems from occurring or becoming insurmountable.

- Monitoring is in the applicant's responsibility and must be done.
-

Contracts



Contracts

- Follow local/state/federal procurement codes & standards
- Document what you do
- Ensure costs are reasonable
- Include termination clause



California Emergency Management Agency Disaster Debris Management

- Must use local/state/federal procurement procedures
- Documents the process
- Costs must be reasonable
- Include a termination clause

Remember



Most Importantly

- Document any threats to public health & safety
- Applicant is responsible
- It's your money
- Send daily reports
- Don't be afraid to ask:
 - For help
 - About eligibility issues
 - For a review of your debris removal plan
 - Any question



California Emergency Management Agency Disaster Debris Management

One of the key elements in the disaster assistance process is based upon a need to protect the public from threats to lives, health and safety.

- The applicant is ultimately responsible for debris removal operations.
- Remember, it's your money.
- Daily Reports
- Help is available; don't be afraid to ask for it.
- Good documentation is the best defensive. You might need ammunition to support your actions. This is valuable if you want to appeal a decision.
- Keep documentation for 3 years after the last project has been completed. Pay attention to your document destruction policies, you may need to amend them to address this exception.

Contact Information



Contact Information

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California Emergency Management Agency Disaster Debris Management

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